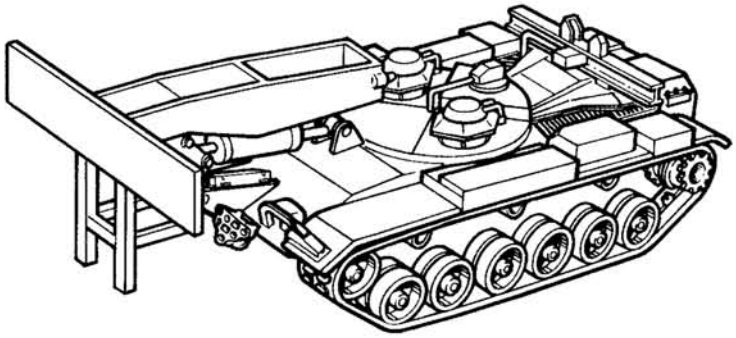
TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE MANUAL



M60A1 TANK CHASSIS, TRANSPORTING: FOR BRIDGE, ARMORED-VEHICLE-LAUNCHED; SCISSORING TYPE, CLASS 60 (5420-00-889-2020)

HEADQUARTERS, DEPARTMENT OF THE ARMY

OCTOBER 1985

WARNING

CARBON MONOXIDE POISONING CAN BE DEADLY

Carbon monoxide is a colorless, odorless, deadly poisonous gas, which when breathed deprives the body of oxygen and causes suffocation. Exposure to air contaminated with carbon monoxide produces symptoms of headache, dizziness, loss of muscular control, apparent drowsiness, and/or coma. Permanent brain damage or death can result from severe exposure. Carbon monoxide occurs in the exhaust fumes of fuel-burning heaters and internal-combustion engines and becomes dangerously concentrated under conditions of inadequate ventilation. The following precautions must be observed to make sure of the safety of personnel whenever the personnel heater, main or auxiliary engine of any vehicle is operated for maintenance purposes or tactical use.

1. DO NOT operate heater or engine of vehicle in an enclosed area unless the area is ADEQUATELY VENTILATED.

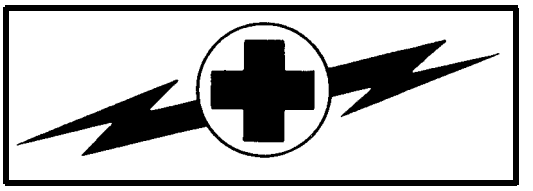
2. DO NOT idle engine for long periods without maintaining ADEQUATE VENTILATION in personnel compartments.

3. DO NOT drive any vehicle with inspection plates, cover plates, or engine compartment doors removed unless necessary for maintenance purposes.

4. BE ALERT at all times during vehicle operation for exhaust odors and exposure symptoms. If either are present, IMMEDIATELY VENTILATE personnel compartments. If symptoms persist, remove affected personnel from vehicle and treat as follows: expose to fresh air; keep warm; DO NO PERMIT PHYSICAL EXERCISE.
   For artificial respiration, refer to FM 4-25.11.

THE BEST DEFENSE AGAINST CARBON MONOXIDE POISONING IS ADEQUATE VENTILATION.

WARNING



WARNING

HIGH VOLTAGE
Used in the operation of this equipment

DEATH ON CONTACT
May result if personnel fail to observe safety precautions.

Never work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When a technician is aided by operators, he must warn them about dangerous areas.

Whenever possible, the master battery switch and battery ground straps should be either turned off or disconnected before beginning work on the equipment.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through vital organs of the body.

Before you work around tracked vehicles, remove rings, bracelets, and wristwatches. These items may be caught on projections and cause injury or may be shorted across an electrical circuit and cause severe burns and electrical shock.

For artificial respiration, refer to FM 4-25.11.

WARNING

HAZARDOUS NOISE

1. Hearing protection (helmet) required.

2. Double hearing protection (helmet and ear plugs) required on road marches at speeds over 15 mph.

WARNING

The following summary list is adapted from the warnings within this volume. However, all warnings should be observed as noted in the text.

Hold up rear drain valve seat when removing last screw attaching valve seat to hull floor. Valve seat is heavy and can cause injury if it falls.

Hold up front drain valve cage assembly when removing last screw attaching cage to hull. Valve assembly may fall and cause injury if cage is not held up.

Handle charged fire extinguisher cylinders with care. Do not jar or subject cylinders to temperature above 140 degrees F (60 degrees C).

Driver's hatch cover weights approximately 130 pounds. Do not try to lift it alone.

The unit commander or senior officer in charge of maintenance personnel assigned to remove and dispose of contaminated gas filters must prescribe necessary protective clothing to be worn when replacing gas particulate filters. He must also prescribe necessary safety measures to be performed before new gas filters are installed.

Contaminated gas particulate filters must be handled in accordance with FM 21-40 and must be disposed of by trained personnel.

Compressed air used for cleaning purposes will not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.)

FRH hydraulic fluid may contain Tricresyl Phosphate which if taken internally, can produce paralysis.

Hydraulic fluid may be absorbed through the skin. Wear 1ong sleeves,glove, goggles, and face shield. If FRH gets in eyes, wash them immediately and get medical aid immediately. If FRH gets on skin, thoroughly wash with soap and water. Wash hands thoroughly prior to eating or smoking. Application of these measures is considered an effective control of the hazard.

Dry cleaning solvent P-D-680 is toxic and flammable. To prevent personal injury, wear protective goggles and gloves and use only in a well-ventilated area. Avoid contact with skin, eyes, and clothes and don't breathe vapors. Do not use near open flame or excessive heat. The flash point for Type #l Dry Cleaning Solvent is 100°F (38°C) and for Type #2 is 138°F (50°C). If you become dizzy while using cleaning solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

WARNING

Failure to correctly connect brake quick disconnect will result in brake failure and could cause serious injury or death.

CHANGE

NO. 6

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 30 October 2006

ORGANIZATIONAL MAINTENANCE

M60A1 TANK CHASSIS, TRANSPORTING: FOR BRIDGE, ARMORED-VEHICLE-LAUNCHED; SCISSORING TYPE, CLASS 60 (5420-00-889-2020)

TM 5-5420-202-20-1, dated 25 October 1985, is changed as follows:

1. Remove old pages and insert new pages as indicated below.
2. New or changed material is indicated by a vertical bar in the margin of the page.

Remove Pages	Insert Pages
None	A thru F
i and ii	i and ii
v/(vi blank)	v/(vi blank)
1-1 and 1-2	1-1 and 1-2
1-7 and 1-8	1-7 and 1-8
2-1 and 2-2	2-1 and 2-2
2-13 and 2-14	2-13 and 2-14
3-3 and 3-4	3-3 and 3-4
4-1 and 4-2	4-1 and 4-2
4-19 thru and 4-24	4-19 thru 4-24
4-25 and 4-26	4-25 and 4-26
4-29 and 4-30	4-29 and 4-30
4-31 thru 4-46	4-31 and 4-46
4-397 thru 4-400	4-397 thru 4-400
None	4-414.1 thru 4-414.30
4-415 and 4-416	4-415 and 4-416
2028 Sample and blank	None
2028 and Envelope	2028 and back
2028 and Envelope	2028 and back
2028 and Envelope	2028 and back
Front Cover (inside blank)	Front Cover and PIN

File this change sheet in front of the publication for reference purposes.

By Order of the Secretary of the Army:

PETER J. SCHOOMAKER
General, United States Army
Chief of Staff

Official:

JOYCE E. MORROW
Administrative Assistant to the
Secretary of the Army
0615907

Distribution: To be distributed in accordance with the initial distribution number (IDN) 371049 requirements for TM 5-5420-202-20-1.

TM 5-5420-202-20-1
C5

CHANGE
NO. 5

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 14 October 2005

ORGANIZATIONAL MAINTENANCE

M60A1 TANK CHASSIS, TRANPORTING: FOR BRIDGE, ARMORED-VEHICLE-LAUNCHED; SCISSORING TYPE, CLASS 60 (5420-00-889-2020)

TM 5-5420-202-20-1, dated 25 October 1985, is changed as follows:

1. Remove old pages and insert new pages as indicated below.

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Remove Page	Insert Pages
c/d blank)	c and d
None	A through F
None	3-110.1/(3-110.2 blank)
3-111 and 3-112	3-111 and 3-112
Sample DA Forms 2028-2	Sample DA Forms 2028
DA Forms 2028-2	DA Forms 2028

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CHANGE

NO. 4

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., 15 May 1996

TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE

M60A1 TANK CHASSIS,

TRANSPORTING:

FOR BRIDGE,

ARMORED-VEHICLE-LAUNCHED;

SCISSORING TYPE, CLASS 60

(NSN 5420-00-889-2020)

TM 5-5420-202-20-1, dated 25 October 1985, is changed as follows:

1. Remove old pages and insert new pages as indicated below.

2. New or changed information is indicated by a vertical bar in the margin of the page.

Remove Pages	Insert Pages
v/(vi blank)	v/(vi blank)
3-7 thru 3-42	3-7 thru 3-42
3-42.1 thru 3-42.4	None
3-43 thru 3-87/(3-88 blank)	3-43 thru 3-88
None	3-89 thru 3-113/(3-114 blank)

By Order of the Secretary of the Army:

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General, United States Amry
Chief of Staff

Official:

JOEL B. HUDSON
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CHANGE

NO. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington D. C., 27 *February 1992*

TECHNICAL MANUAL

ORGANIZATIONAL MAINTENANCE

M60A1 TANK CHASSIS,
TRANSPORTING:
FOR BRIDGE,
ARMORED-VEHICLE-LAUNCHED;
SCISSORING TYPE, CLASS 60
(5420-00-889-2020)

TM 5-5420-202-20-1, 28 October 1985, is changed as follows:

1. Remove old pages and insert new pages as indicated below.

2. New or changed material is indicated by a vertical bar in the margin of the page.

Remove Pages	Insert Pages
1-7 and 1-8	1-7 and 1-8
3-1 thru 3-10	3-1 thru 3-10
3-13 and 3-14	3-13 and 3-14
3-33 thru 3-36	3-33 thru 3-36
3-71 and 3-7	3-71 and 3-72
3-85 and 3-86	3-85 and 3-86
4-25 and 4-26	4-25 and 4-26
4-697 thru 4-700	4-697 thru 4-700

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By Order of the Secretary of the Army:

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Chief of Staff

Official:

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00512

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Posted

TM 5-5420-202-20-1
C2

CHANGE

NO. 2

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., *2 December 1987*

Organizational Maintenance

M60A1 TANK CHASSIS, TRANSPORTING:
FOR BRIDGE, ARMORED-VEHICLE-LAUNCHED;
SCISSORING TYPE, CLASS 60

(5420-00-889-2020)

TM 5-5420-202-20-1, 25 October 1985, is changed as follows:

1. Remove old pages and insert new pages as indicated below.
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Remove Pages	Insert Pages
3-5 and 3-6	3-5 and 3-6

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Official:

R.L. DILWORTH
Brigadier General, United States Army
The Adjutant General

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Faded

TM 5-5420-202-20-1
C1

CHANGE

NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
Washington, D.C., *1 May 1986*

TECHNICAL MANUAL
ORGANIZATIONAL MAINTENANCE

M60A1 TANK CHASSIS, TRANSPORTING: FOR BRIDGE, ARMORED-VEHICLE-LAUNCHED; SCISSORING TYPE, CLASS 60

(5420-00-889-2020)

TM 5-5420-202-20-1, 1985, is changed as follows:

1. Remove old pages and insert new pages as indicated below.
2. New or changed material is indicated by a vertical bar in the margin of the page.

Remove Pages	Insert Pages
1-9 and 1-10	1-9 and 1-10
None	2-12.1/(2-12.2 blank)
3-1 thru 3-4	3-1 thru 3-4
3-19 thru 3-26	3-19 thru 3-26
3-41 and 3-42	3-41 and 3-42
None	3-42.1 thru 3-42.4
3-47 and 3-48	3-47 and 3-48
4-21 thru 4-24	4-21 thru 4-24
None	4-24.1 and 4-24.2
None	4-306.1 thru 4-306.29/ (4-306.30 blank)

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The Adjutant General

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LIST OF EFFECTIVE PAGES **INSERT LATEST CHANGED PAGES. DESTROY SUPERSEDED PAGES.**

Note: The portion of the text affected by the changes is indicated by a vertical line or an asterisk.

Dates of issue for original and changed pages are:

Original 0 ..... 25 October 1985
Change 1 ..... 01 May 1986
Change 2 ..... 02 December 1987
Change 3 ..... 27 February 1992
Change 4 ..... 15 May 1996
Change 5 ..... 14 October 2005
Change 6 ..... 30 October 2006

TOTAL NUMBER OF PAGES IN THIS PUBLICATION IS 1024, CONSISTING OF THE FOLLOWING:

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Front Cover Back PIN	6
a	0
b	0
c	5
d BLANK	5
A	6
B	6
C	6
D	6
E	6
F	6
i	6
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iii	0
iv	0
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3-74	4
3-75	4

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3-77	4	4-24	1	4-83	0
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3-79	4	4-24.2 ADDED	1	4-85	0
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3-81	4	4-26	3	4-87	0
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3-83	4	4-28	0	4-89	0
3-84	4	4-29	0	4-90	0
3-85	4	4-30	6	4-91	0
3-86	4	4-31	6	4-92	0
3-87	4	4-32 DELETED	6	4-93	0
3-88	4	4-33 DELETED	6	4-94	0
3-89	4	4-34 DELETED	6	4-95	0
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3-91	4	4-36 DELETED	6	4-97	0
3-92	4	4-37 DELETED	6	4-98	0
3-93	4	4-38 DELETED	6	4-99	0
3-94	4	4-39 DELETED	6	4-100	0
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4-20	6	4-79	0	4-140	0
4-21	6	4-80	0	4-141	0
4-22	1	4-81	0	4-142	0

***Zero in this column indicates an original page.**

Page No.	*Change No.	Page No.	*Change No.	Page No.	*Change No.
4-143	0	4-204	0	4-266	0
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4-203	0	4-265	0	4-306.20 ADDED	1

***Zero in this column indicates an original page.**

Page No.	*Change No.
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Technical Manual
No. 5-5420-202-20-1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C.,25 *OCTOBER 1985*

ORGANIZATIONAL MAINTENANCE MANUAL

M60A1 TANK CHASSIS, TRANSPORTING: BRIDGE, ARMORED-VEHICLE-LAUNCHED: SCISSORING TYPE; CLASS *60*

NSN 5420-00-889-2020

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Submit your DA Form 2028 (Recommended Changes to Equipment Technical Publications), through the Internet, on the Army Electronic Product Support (AEPS) website. The Internet address is https://aeps.ria.army.mil. The DA Form 2028 is located under the Public Applications section in the AEPS Public Home Page. Fill out the form and click on SUBMIT. Using this form on the AEPS will enable us to respond quicker to your comments and better manage the DA Form 2028 program. You may also mail, fax or e-mail your letter or DA Form 2028 direct to: AMSTA-LC-LPIT/TECH PUBS, TACOM-RI, 1 Rock Island Arsenal, Rock Island, IL 61299-7630. The e-mail address is TACOM-TECH-PUBS@ria.army.mil. The fax number is DSN 793-0726 or Commercial (309) 782-0726.

TABLE OF CONTENTS

VOLUME 1

★'This manual together with TM 5-5420-202-20-2, TM 5-5420 -202-20-3 and TM 5-5420 -202-20-4 supersedes TM 5-5420-202-20,14, January 1976.

TABLE OF CONTENTS - Continued

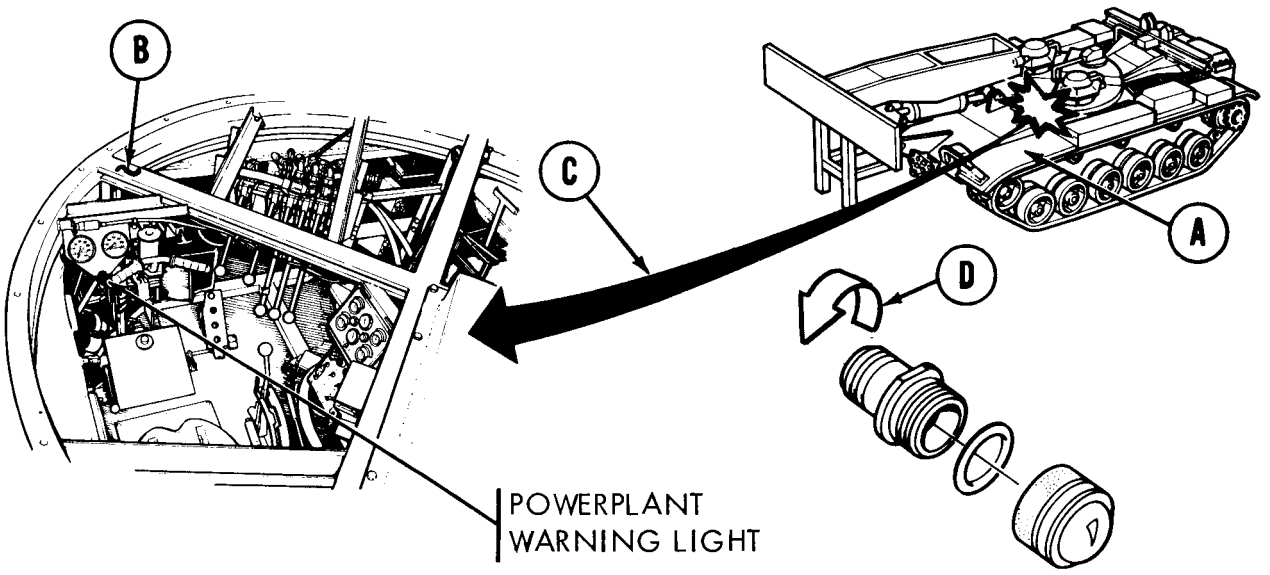
VOLUME 2

TABLE OF CONTENTS - Continued

VOLUME 4- Continued

HOW TO USE THIS MANUAL:

- Manual is divided into chapters.
- Chapters are by functional group code and are presented in same order as the RPSTL (Repair Parts and Special Tools List).
- Procedure indexes are on procedures that are four pages or more, and indicate how the procedure is set up, i.e., disassembly, removal, cleaning, inspection, etc.
- All references within this technical manual refer to page numbers.
- Steps are numbered and are to be performed in that order.
- Be sure to read all NOTES, WARNINGS, and CAUTIONS.
- Locator views are included wherever necessary. These will help you locate the item which the procedure› is referencing.
- Jagged circle (*) on locator (A) indicates a cutout and means the item is inside the vehicle.
- A (~) symbol represents the outside surface (B) of a piece of equipment that cannot be shown in its entirety.
- Callouts are shown by a circle with a letter inside.
- Locator arrows (C) are black, and mechanical motion arrows (D) are white.
- Broken leader arrow (- - ➤) indicates the item is either inside or under the vehicle and cannot be seen.



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HOW TO USE THIS MANUAL - Continued

- An illustrated list of manufactured items includes complete instructions for making items authorized to be manufactured or fabricated and used at organizational maintenance.
- A maintenance information index lists all parts subject to maintenance tasks. It provides the location of all maintenance tasks related to a component in this manual.
- Certain sections of the manual have detailed "how to use " instructions at the beginning of the section - for example: troubleshooting.
- As a general maintenance practice, throw away all removed lockwashers, locknuts, o-rings, preformed packing, and cotter pins, and replace with new lockwashers, locknuts, o-rings, preformed packing, and cotter pins at installation.

CHAPTER 1

INTRODUCTION

Section I. GENERAL INFORMATION

SCOPE

Type of Manual: Organizational Maintenance

Model Number and Equipment Name: M60A1 Tank Chassis, Transporting for Class 60 Scissoring Type, Armored-Vehicle-Launched Bridge (M60A1 AVLB).

Purpose of Equipment: Provide a transportable bridge that can be launched and retrieved while providing maximum ballistic protection for the crew.

MAINTENANCE FORMS, RECORDS, AND REPORTS

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by PAM 750-8, The Army Maintenance Management System (TAMMS).

REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR'S)

If your M60A1 AVLB needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about our equipment. Let us know why you don't like the design. Tell us why a procedure is hard to perform. Put it on an SF 368 (Quality Deficiency Report). Mail it to: Commander, U.S. Army Tank-Automotive Command, AMSTA-Q, Warren, Michigan 48397-5000. We'll send you a reply.

USE OF ENGLISH AND METRIC SYSTEM UNITS

Torque values specified in this manual are expressed in pound-feet (lb-ft.) or pound-inches (lb.-in.) followed by the metric equivalent in parentheses. The metric equivalent is expressed in system international units Newton meters (N•m). The metric system and equivalents conversion table is located on inside back cover of this manual.

DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

Refer to TM 750-244-6 for instructions on destruction of materiel to prevent enemy use.

ADMINISTRATIVE STORAGE

Refer to TM 740-90-1 for instructions on administrative storage.

QUALITY ASSURANCE/QUALITY CONTROL (QA/QC)

a. No particular quality assurance or quality control manual pertains specifically to the M60A1 AVLB.

b. Defective materiel received through the supply system should be reported on Quality Deficiency Report (QDR) SF 368. Instructions for preparing QDR's are provided in AR 702-7, Reporting of Quality Deficiency Data. QDR's should be mailed to Commander, U.S.

Army Tank-Automotive Command, ATTN: AMSTA-Q, Warren, MI 48397-5000. A reply will be furnished to you.

Section II EQUIPMENT DESCRIPTION AND DATA

PURPOSE OF THE M60A1 ARMORED VEHICLE BRIDGE LAUNCHER

Capabilities and Features

- Provides a transportable bridge that can be launched and retrieved.
- Suited to a nuclear environment because armor protection reduces effects of blasts and radiation.
- Can be dispersed and concentrated rapidly over great distances.
- Provides deep penetration due to mobility and flexibility
- Provides close combat vehicle support.
- Major components:

1. Hull
2. Power train
3. Fuel system
4. Air intake system
5. Exhaust system
6. Cooling system
7. Electrical system
8. Tracks and suspension
9. Personnel heater
10. Steering and shifting controls
11. Accelerator controls
12. Brake controls
13. Fixed fire extinguisher system

LOCATION AND DESCRIPTION OF EXTERNAL COMPONENTS

(A) **FIXED FIRE EXTINGUISHER HANDLE**

Permits crew to release first and second shot of $C0_2$ into the engine compartment in the event of a powerplant fire.

(B) **GRILLE DOORS**

Provides access to powerplant.

(C) **PINTLE**

Permits attaching tow bar for towing or recovery of disabled vehicles.

(D) **TRACK AND SUSPENSION**

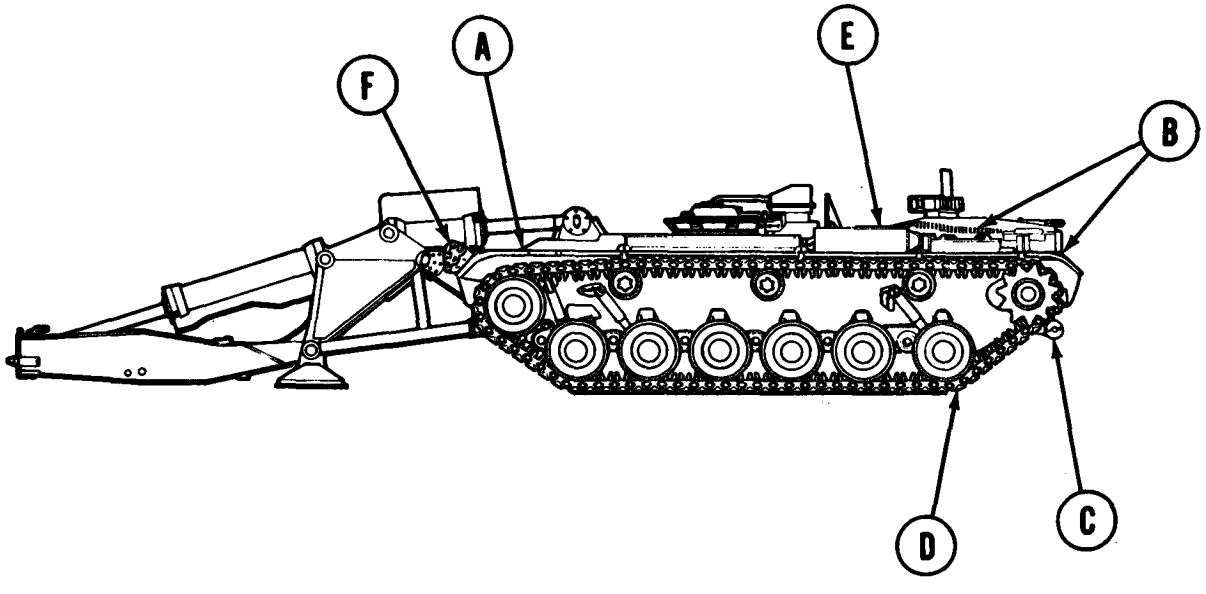
Provides optimum riding characteristics, over all types of terrain, by utilizing transverse torsion bars and individually supported roadwheels.

(E) **AIR CLEANER**

Filters engine combustion air prior to delivery to engine turbocharger. Draws air, through air intake screen. Removes larger dust partitles in precleaned section and exhausts them by blower motor. Removes finer particles by surface-type air filter.

(F) **SMOKE GRENADE LAUNCHER**

Provides the vehicle with a self-screening capability.



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LOCATION AND DESCRIPTION OF INTERNAL COMPONENTS (1 of 2)

(A) TRANSMISSION

Transmits engine power to the final drives to move the vehicle. The transmission has two forward ranges, low and high, and one reverse range.

(B) UNIVERSAL JOINT

Transmits power from transmission to final drives. There is one universal joint on each side of the transmission.

(C) ENGINE WITH POWER TAKEOFF

Provides power to move vehicle. Provides power to drive hydraulic pump.

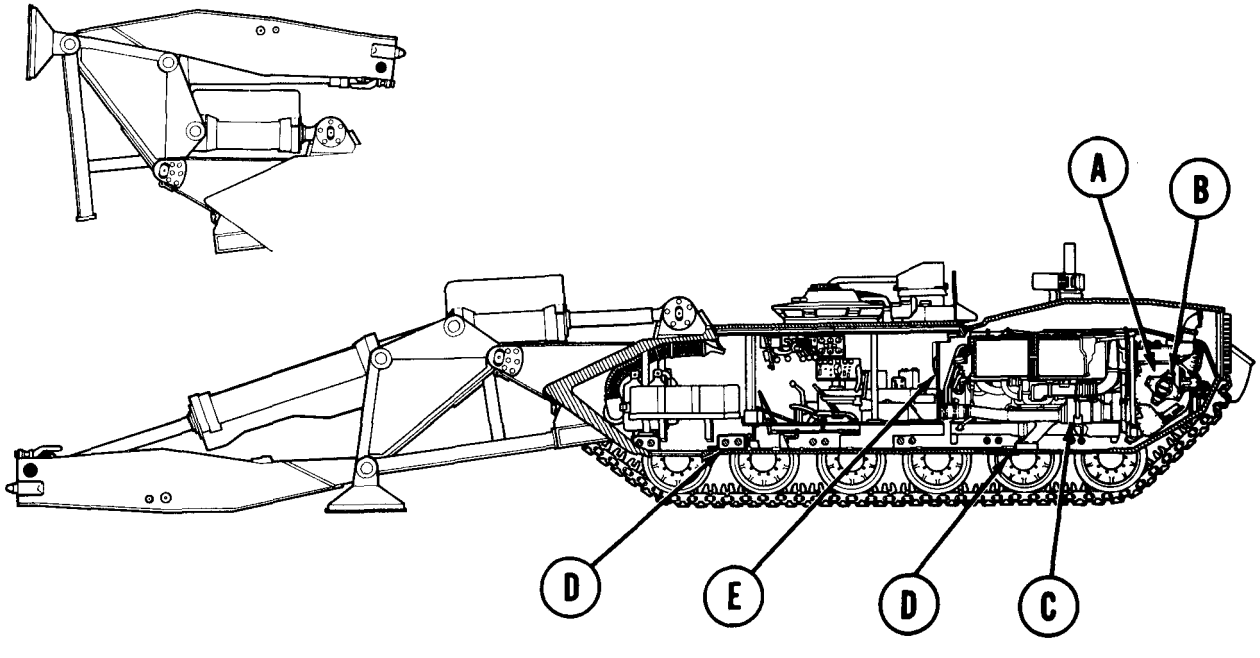
(D) HULL DRAIN VALVES

Provides means for draining any water accumulated.

(E) ENGINE AIR CLEANER INTAKE

Provides means of drawing air from crew compartment for air cleaners. This is usually done during fording or during operation under dusty or sandy conditions.

LAUNCHER IN
TRAVEL POSITION



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LOCATION AND DESCRIPTION OF INTERNAL COMPONENTS (2 of 2)

(F) DRIVER'S CONTROL PANELS

Provides driver with means of monitoring all systems during vehicle operation. The panels are mounted to the right of the driver's station.

(G) BATTERIES

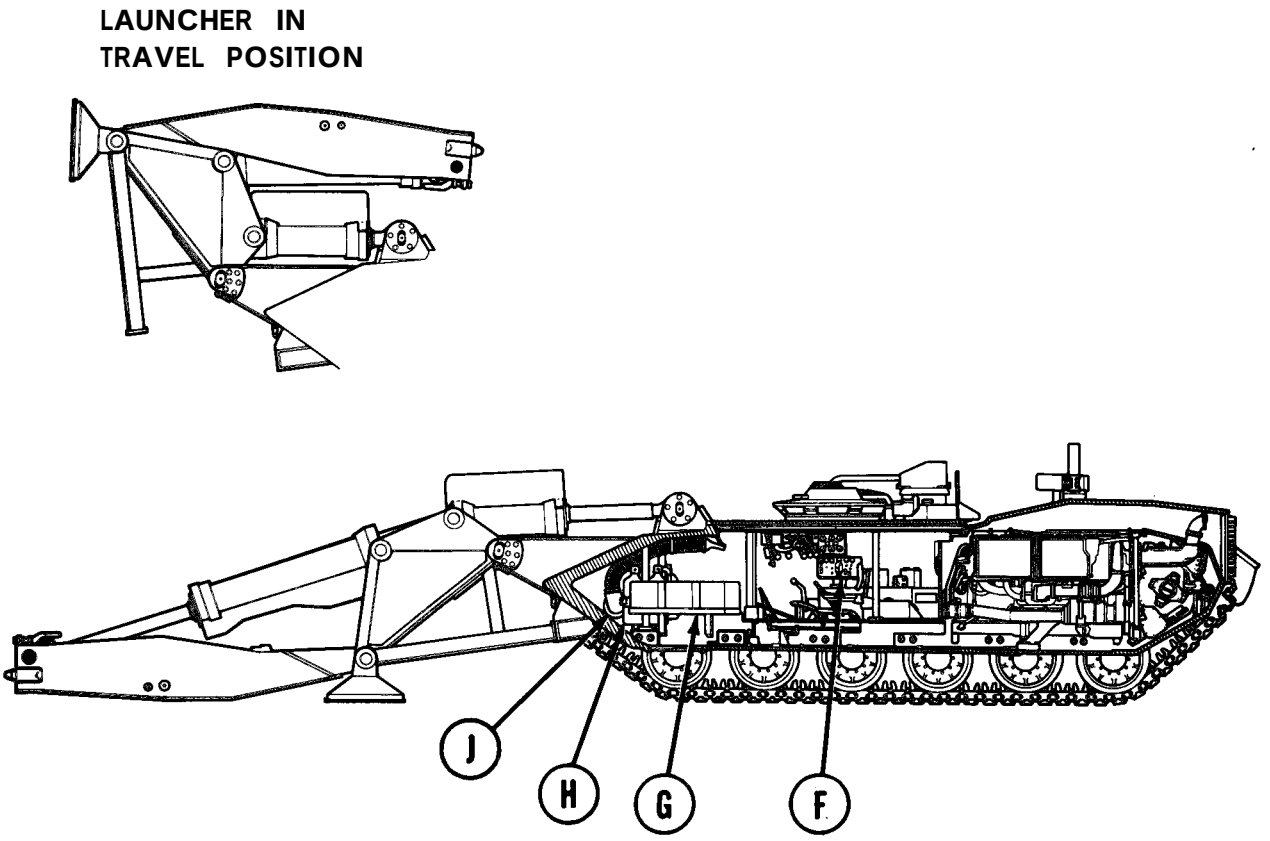
The six vehicle batteries are located forward of the operator on the hull floor, three on either side of the vehicle. They supply a 24-vo1t power source for the vehicle electrical system.

(H) FIXED FIRE EXTINGUISHERS

Provides a first and second shot of $C0_2$ into the engine compartment in the event of a powerplant fire.

(J) PERSONNEL HEATER

Provides heated air to hull for crew comfort during cold temperatures. Heater is turned on by a switch located on driver's control panel.



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LOCATION OF DATA PLATES

Refer to TM 5-5420-202-10 for location of data plates.

EQUIPMENT DATA

Engine Characteristics

Manufacturer	Teledyne Continental
Model	AVDS-1790-2D
Speed:	
Governed, full load	2400 rpm
Governed, no load	2550 rpm
Idle	700-750 rpm
Horsepower, gross	750 bhp at 2400 rpm
Cooling system	Engine driven fans for cylinders, transmission and engine oil coolers
Induction system	Supercharged by two exhaust driven turbo-chargers
Oil pressure:	
At 700 rpm idle	20 psi with SAE 30 at 180°F
At 2400 rpm full load	50 to 70 psi with SAE 30 at 180°F
Oil temperature:	
Normal	180°F at 60°F ambient
Maximum	250°F
Lubricating oil:	
Type	LO 5-5420-202-12
Capacity	Dry engine-20 gallons, oil change- 17 gallons
Fuel:	
Type	Diesel
Grade	40 cetane min.
Specification	VV-F-800
Consumption	310 lb/hr at 2400 rpm and 750 bhp

Transmission Characteristics

Manufacturer	Detroit Allison Diesel
Model	CD-850-6A
Type	Cross-drive with hydraulic torque converter
Suspension	3-point (attached to engine and two transmission mounts)
Oil pumps:	
Number	Two
Oil capacity	20 gal (approx.)
Oil capacity, including coolers	25 gal (approx.)
Oil filter	air-maze, double, sock- type

Fuel System Characteristics

Fuel tanks:	
Capacity (total)	385 gallons
Left tank	189 gallons
Right tank	196 gallons
Construction	Welded aluminum
Intertank isolation valve:	
Type	3-inch butterfly
Rated flow	50 gpm
Operated pressure	4.5 psi
Fuel return selector valve:	
Type	Ball rotor
Rated flow	3.7 gpm
Operated pressure	30 psi
Fuel tank electrical fuel pumps:	
Type	Impeller (indirect drive, dry motor, hermetrically sealed, magnetic coupling)
Rated capacity	220 gph at 5 psi
Check valve:	
Type	Double swing-check
Operating pressure	50 psi
Opening pressure	0.2 psi max
Primary fuel filter (disposable element)	40 micron
Fuel/water separator fuel filter (disposable inner element)	5 micron
Water separator filter (disposable inner element)	5 micron
Water separator filter (disposable outer element)	10 micron
Manifold heater fuel filter	10 micron
Purge line fuel filter	10 micron
Manifold heater solenoid valves	Fuel shutoff
Manifold heater spark plug	Gap 0,094 to 0.114 in.

Electrical System Characteristics

Air cleaner blower:	
Operating voltage	24 volts
Maximum current	7.5 amps at 77°F
Full load speed	11,500 rpm
Air flow (cubic feet per min)	60 CFM
Star ter assembly:	
Type	Solenoid-operated, enclosed lever
Voltage	24 vdc
Maximum rated current at full load	800 amp
Batteries:	
Type	6 TN (MS35000-3)
Voltage	12
Ampere-hour rating	100
Alternator (HEU Configuration)	
Voltage	Regulated between 27 to 29 vdc
Output	650 amps
Voltage Regulator (HEU Configuration)	
Type	Solid state
Voltage	28 vdc
Output	650 amps – 28 volts
Generator	
Voltage	Regulated between 25.8 to 30.2 vdc
Output	300 amps – 28 volts
Voltage Regulator:	
Type	Solid state
Voltage	28 vdc
Output	300 amps
Weight	6 lb
Special provisions	Waterproof
Headlights:	
Service drive headlamp	24 v sealed beam
Blackout drive (infrared headlamp)	24 v sealed beam
Blackout drive lamp	32 cp, 24-28 vdc
Blackout marker lamp	3 cp, 24-28 vdc
Taillights:	
Right taillight	
Blackout drive/marker lamp	3 cp, 24-28 vdc
Blackout stop lamp	3 cp, 24-28 vdc
Left taillight	
Service tail lamp	3 cp, 24-28 vdc
Blackout drive/marker lamp	3 cp, 24-28 vdc
Service stop lamp	32 cp, 24-28 vdc
Domelight and rheostat:	
Domelight	6 cp, 24-28 V and 15 cp, 24-28 V
Infrared powerpack:	
Input voltage	24 vdc

Suspension System Characteristics

Torsion bar:	
Number	12
Weight	105 lb
Diameter	2.35 in.
Length	82.25 in.
Roadwheels:	
Number	12 dual
Diameter	26 in.
Tire width	5.75 in.
Surfacing	Rubber, 1.5 in. thick
Compensating idler wheels:	
Number	2 dual
Diameter	26 in.
Tire width	5.75 in.
Surfacing	Rubber, 1.5 in. thick
Drive sprocket:	
Number	4 (one pair each side)
Track:	
Number	2 (one per side)
Type	T142/T97
Width	28 in.
Guide type	Centerguide
Length (ground contact)	166.72 in.
Distance between tracks center line	115 in.
Track pads:	
Number	320 (two per track shoe)
Thickness	2.12 in.
Height (above steel grouser)	0.89 in.
Contact area	67.1 sq. in.
Type	Rubber (replaceable)
Track shoes:	
Number	80 (each track)
Weight (per shoe assembly)	75.5 lb
Track guide type	Centerguide
Track adjusting link:	
Number	2 (one per track)
Assembly type	Screw link or grease actuated
Track support rollers:	
Number	6/10 dual (3 or 5 support) rollers
Diameter	13.56 in.
Tire width	3.5 in.
Surfacing	Rubber, 0.75 in. thick
Shock absorbers:	
Number	6 (3 per side)

Fire Extinguishers System Characteristics

Fixed:	
Type	Two shot $C0_2$ system
Number	Three ten-pound charged bottles
First shot	One ten-pound bottle
Second shot	Two ten-pound bottles
Force required to actuate handle	55 lb maximum
Actuation time for first shot	4 sec maximum
CO_2 discharge time delay	11 sec maximum
Peak CO_2 concentration	70% minimum
CO_2 system total discharge time	60 sec maximum
Auxiliary:	
Type	Portable CO_2
Number	One 2.5 pound unit
Location	Behind operator's seat

Personnel Heater System Characteristics

Personnel heater:	
Current consumption	Max. values
Starting	13 amp above 45°F 23 amp below 45°F
Operating	12 amp above 45°F 18 amp below 45°F
Fuel	Any hydrocarbon fuel ranging from gasoline per MIL-G-3056 (use type II below O°F) through DF1, DF2, or DFA per spec. VV-F-800 down to cloud point of fuel except to -65°F when using DAF
Fuel pressure	3 to 15 psig at fuel inlet at 70°F ambient

CHAPTER 2

PRINCIPLES OF OPERATION

Section I - FUNCTIONAL DESCRIPTION

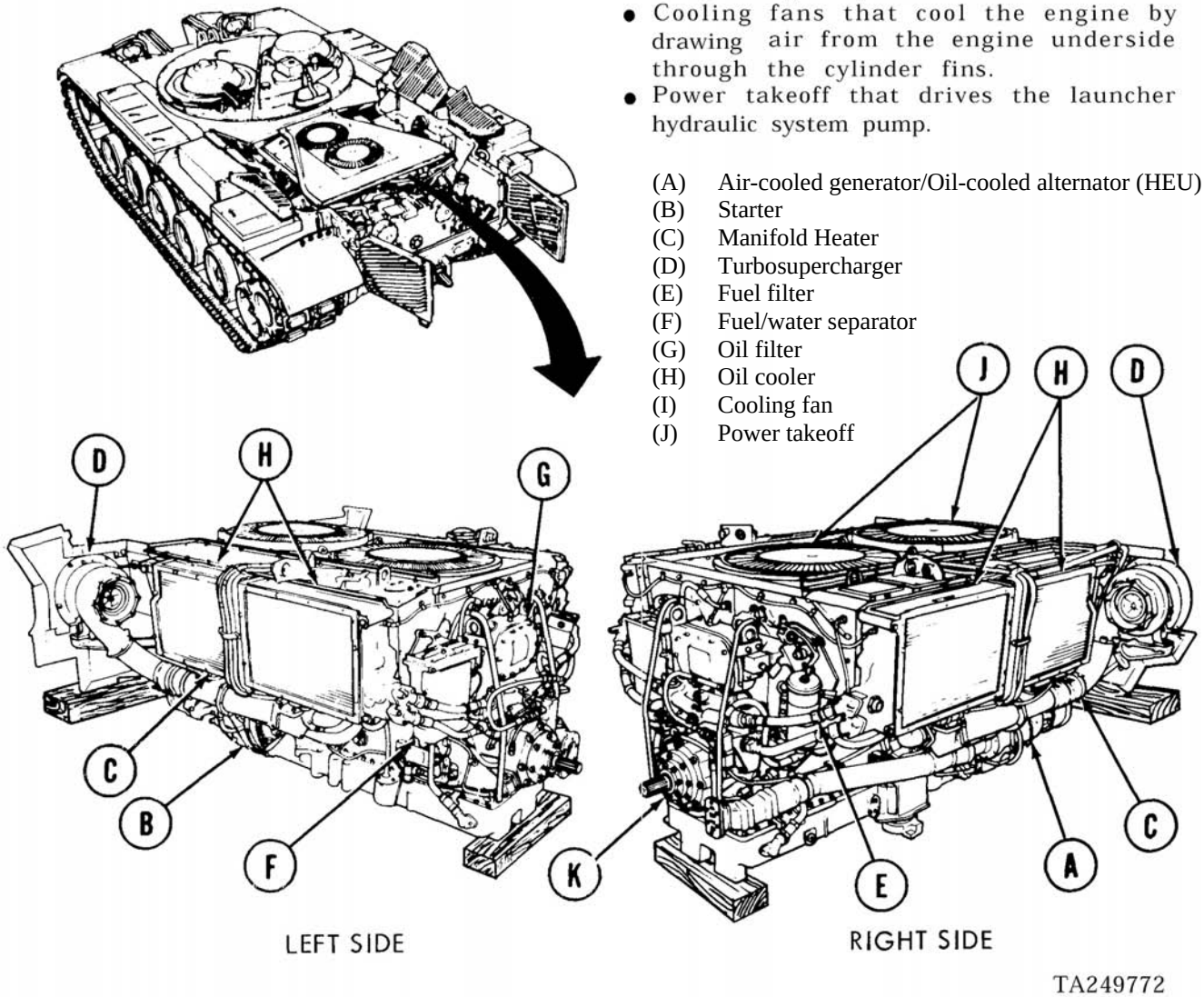
This chapter contains functional descriptions of engine and hull systems allocated to organizational maintenance, describing how the systems operate and how the systems relate to other equipment systems of the engine and hull. Systems described in Section II are:

- Engine
  - Engine lubrication subsystem
  - Engine fuel system
- Fuel system
  - Air cleaner assembly
  - Air cleaner hoses and screens
  - Manifold heater
- Fuel tanks and distribution system
  - Primer pump
  - Accelerator controls
- Exhaust system
- Cooling system
- Eletrical system
  - Charging system
  - Starting system
  - Indicators, gages, and controls
  - Lighting system
  - Hull wiring harnesses/connectors
  - Radio interference suppression
- Transmission
- Final drive and coupling (universal joint)
- Brake system
- Tracks and suspension system
- Steering system
- Hull exterior
- Hull interior
- Personnel heater system
- Speedometer and tachometer
- Fixed fire extinguisher system
- Engine smoke generating system

Section II - **SYSTEMS OPERATION**

ENGINE. The M60A1 AVLB is equipped with a Continental Model AVDS-1790-2D, that is a 12 cylinder, 90°, V-type, 4 cycle, air cooled, turbosupercharged diesel engine. Features of the engine include:

- 28-volt direct current air-cooled generator that provides vehicle electrical power.
- 28-volt direct current oil-cooled alternator that provides vehicle electrical power (HEU Configuration).
- 28-volt solenoid operated starter with circuitry that prevents starter activation when vehicle batteries are improperly charged.
- Intake manifold heaters that preheat intake air for easier cold weather starting.
- Turbosuperchargers that increase air intake pressure to produce a high density air that increases engine power.
- Fuel filter and fuel/water separator that remove contaminants and water from the diesel fuel.
- Oil filter and coolers that keep engine and transmission oil free of contaminants and at operating temperature.
- Cooling fans that cool the engine by drawing air from the engine underside through the cylinder fins.
- Power takeoff that drives the launcher hydraulic system pump.

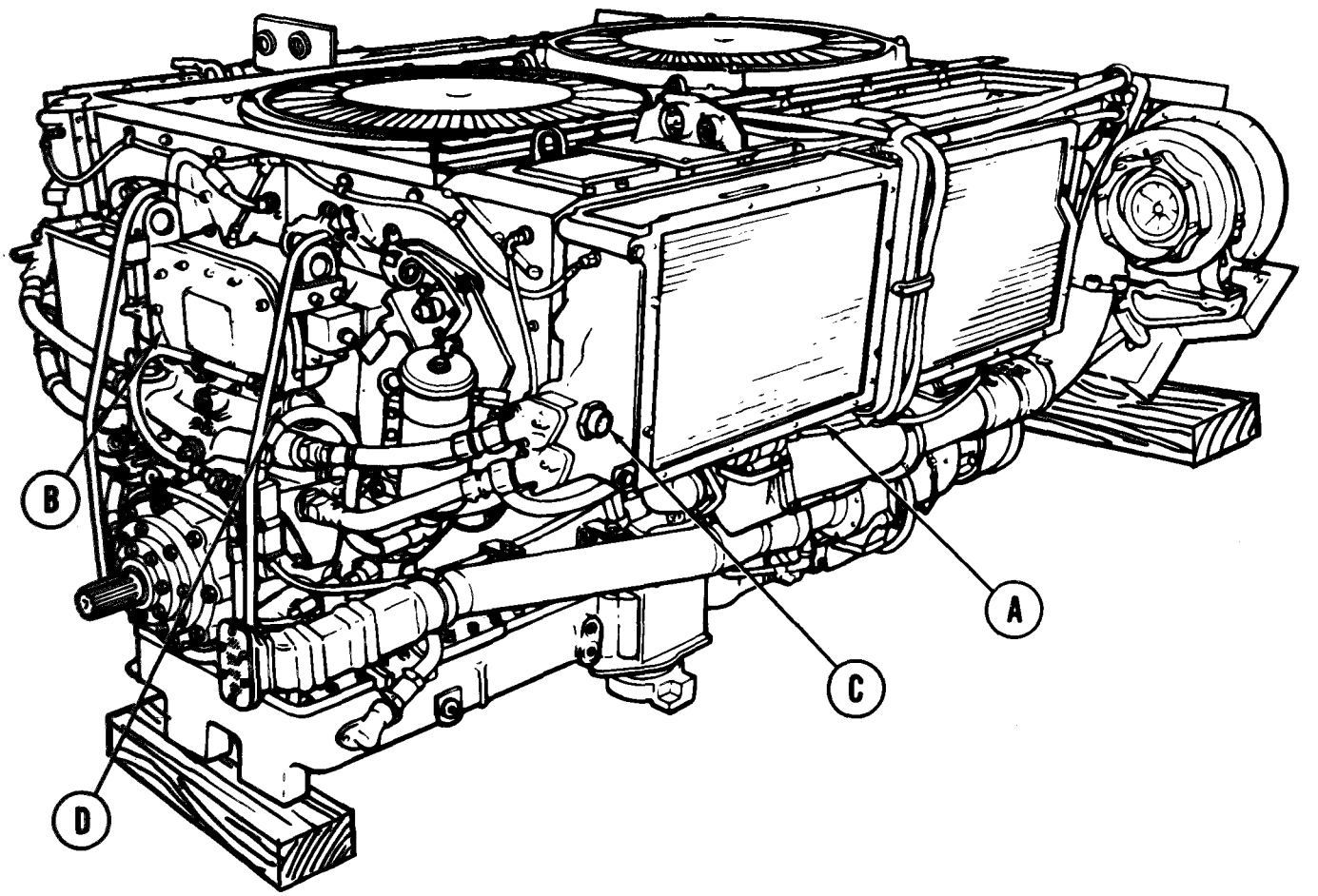


(A) Air-cooled generator/Oil-cooled alternator (HEU)
(B) Starter
(C) Manifold Heater
(D) Turbosupercharger
(E) Fuel filter
(F) Fuel/water separator
(G) Oil filter
(H) Oil cooler
(I) Cooling fan
(J) Power takeoff

TA249772

SYSTEMS OPERATION - Continued

ENGINE LUBRICATION SUBSYSTEM. Forced feed system, drawing oil from oil pan. Oil is forced through engine oil coolers and oil filter to engine oil galleries, bearings, turbosuper-chargers, fuel injection pump, and piston cooling spray jets. A pressure relief valve returns incoming excess unfiltered oil to oil pan. Oil filter and oil cooler bypass valves permit oil to bypass filters if clogged. Engine and transmission oil cooling is accomplished by external oil coolers on sides of engine. Bypass valves in each cooler control oil temperature.

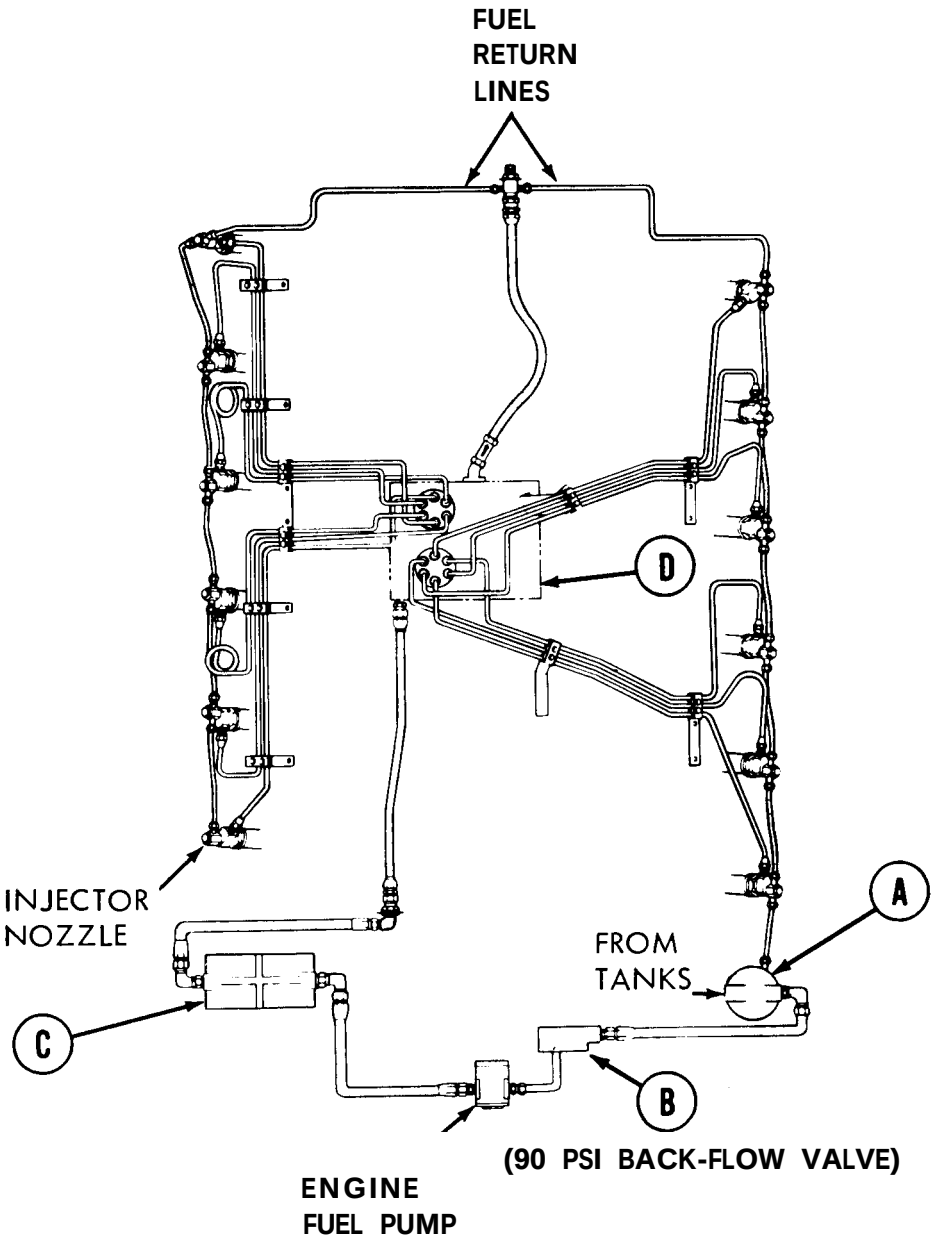


(A) OIL COOLER
(B) OIL FILTER
(C) OIL COOLER BYPASS VALVE
(D) OIL FILTER BYPASS VALVE

TA249773

SYSTEMS OPERATION - Continued

ENGINE FUEL SYSTEM. Fuel flows from tanks to primary fuel filter, through main fuel backflow valve to engine-driven, vane-type fuel pump that increases fuel pressure to fuel injector pump. Fuel from engine fuel pump is filtered through fuel-water separator into injector fuel pump that delivers accurately measured quantities of fuel under high pressure to each cylinder.

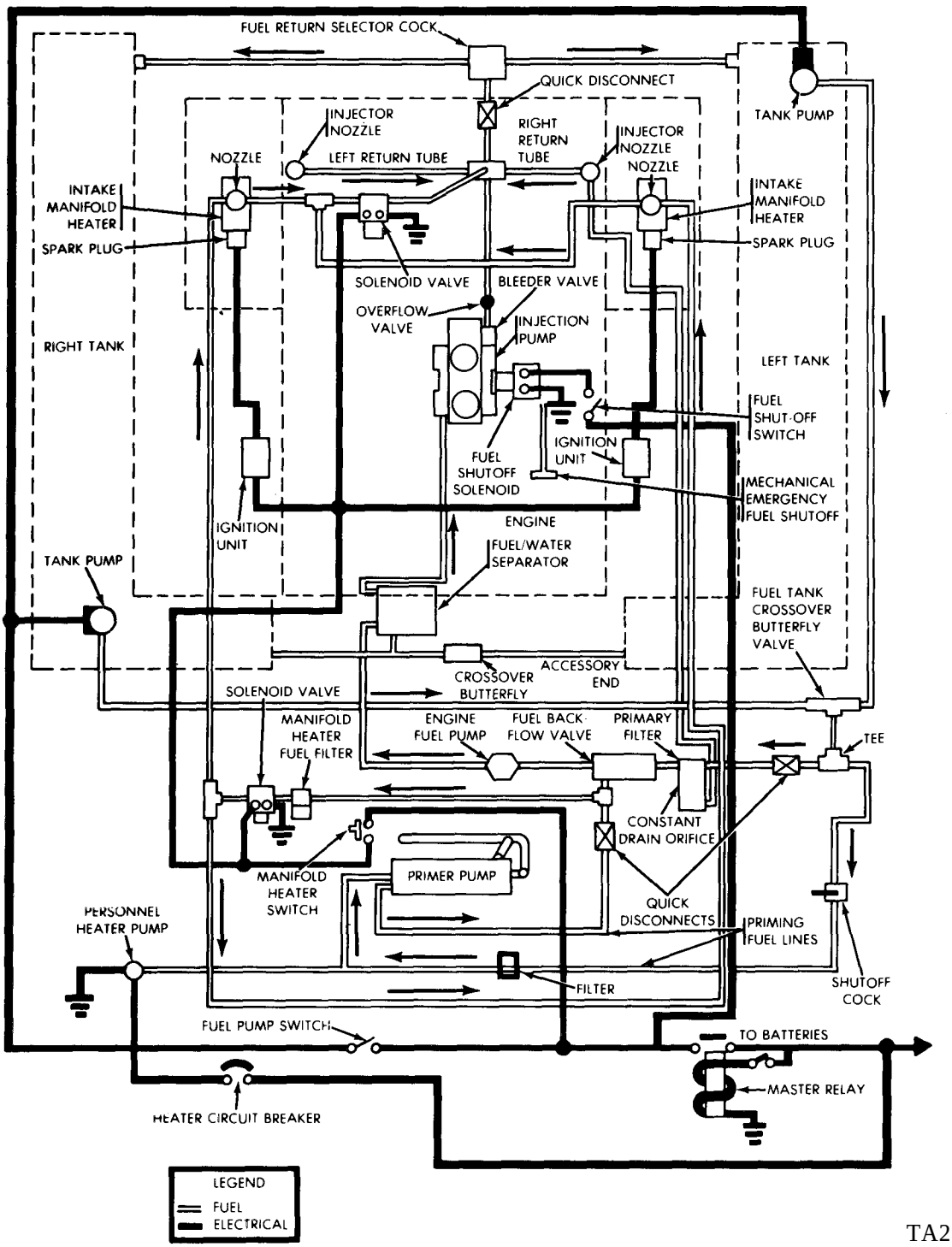


(A) PRIMARY FUEL FILTER
(B) FUEL BACKFLOW VALVE
(C) FUEL-WATER SEPARATOR
(D) FUEL INJECTOR PUMP

TA249774

SYSTEMS OPERATION - Continued

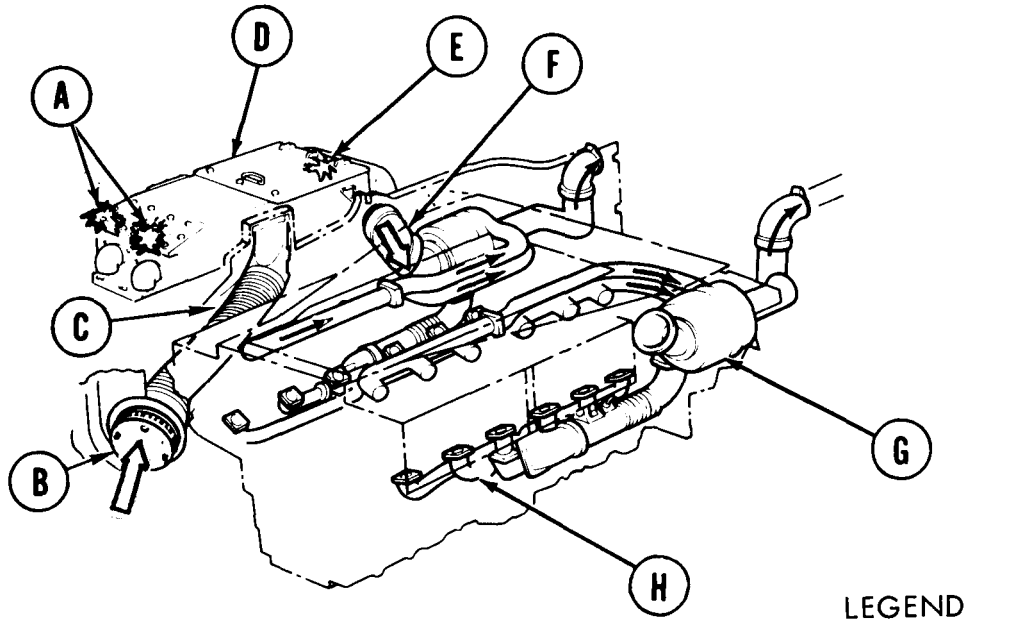
FUEL SYSTEM. Three functions: carrying fuel supply, supplying fuel to engine, supplying fuel to personnel heater and engine air intake manifold heaters. Accelerator controls and linkages are a major part of this system. For engine smoke generator system see page 2-34.



TA249775

SYSTEMS OPERATION - Continued

AIR CLEANER ASSEMBLY. Exhaust-driven turbosupercharger draws air from crew or engine compartment to air cleaners where two centrifugal fans clean air in primary separator stage. Air is drawn into dry-type, layer-filtration filters and is drawn through outlet hoses into turbosupercharger and forced into engine air intake manifolds.



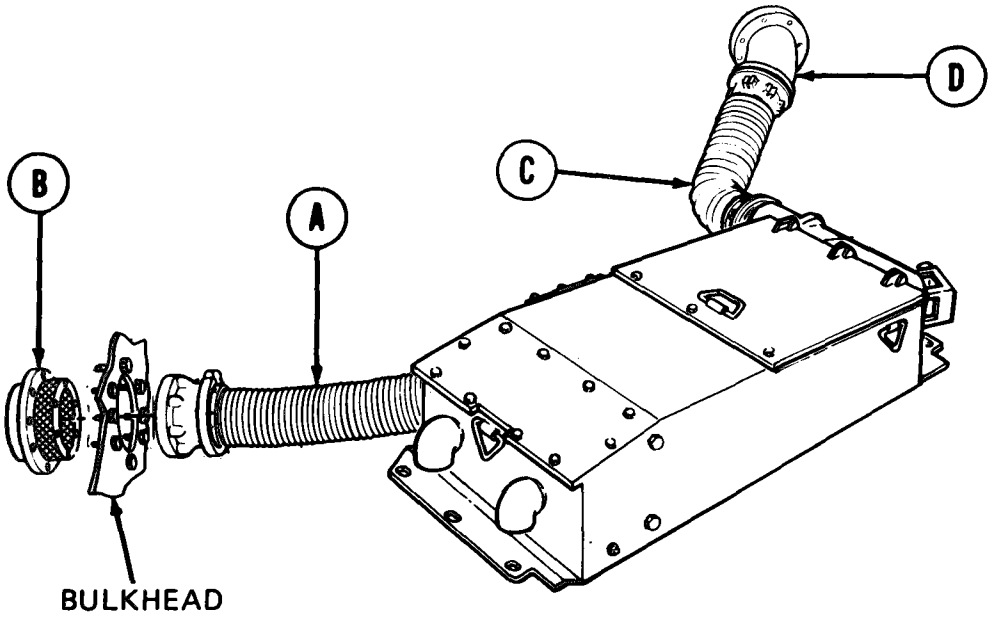
AIR INTAKE SYSTEM

(A) AIR CLEANER BLOWER FANS
(B) ENGINE AIR INTAKE
(C) AIR INTAKE HOSE
(D) AIR CLEANER
(E) DRY-TYPE FILTER UNIT
(F) AIR OUTLET HOSE ASSEMBLY
(G) TURBOSUPERCHARGER
(H) AIR INTAKE MANIFOLD

TA249776

SYSTEMS OPERATION - Continued

AIR CLEANER HOSES AND SCREENS: Air cleaner intake hoses draw air from crew compartment or engine compartment to air cleaner through screen on reversible air intake mounted in bulkhead. Air outlet hoses direct filtered air from air cleaners to turbosuperchargers.

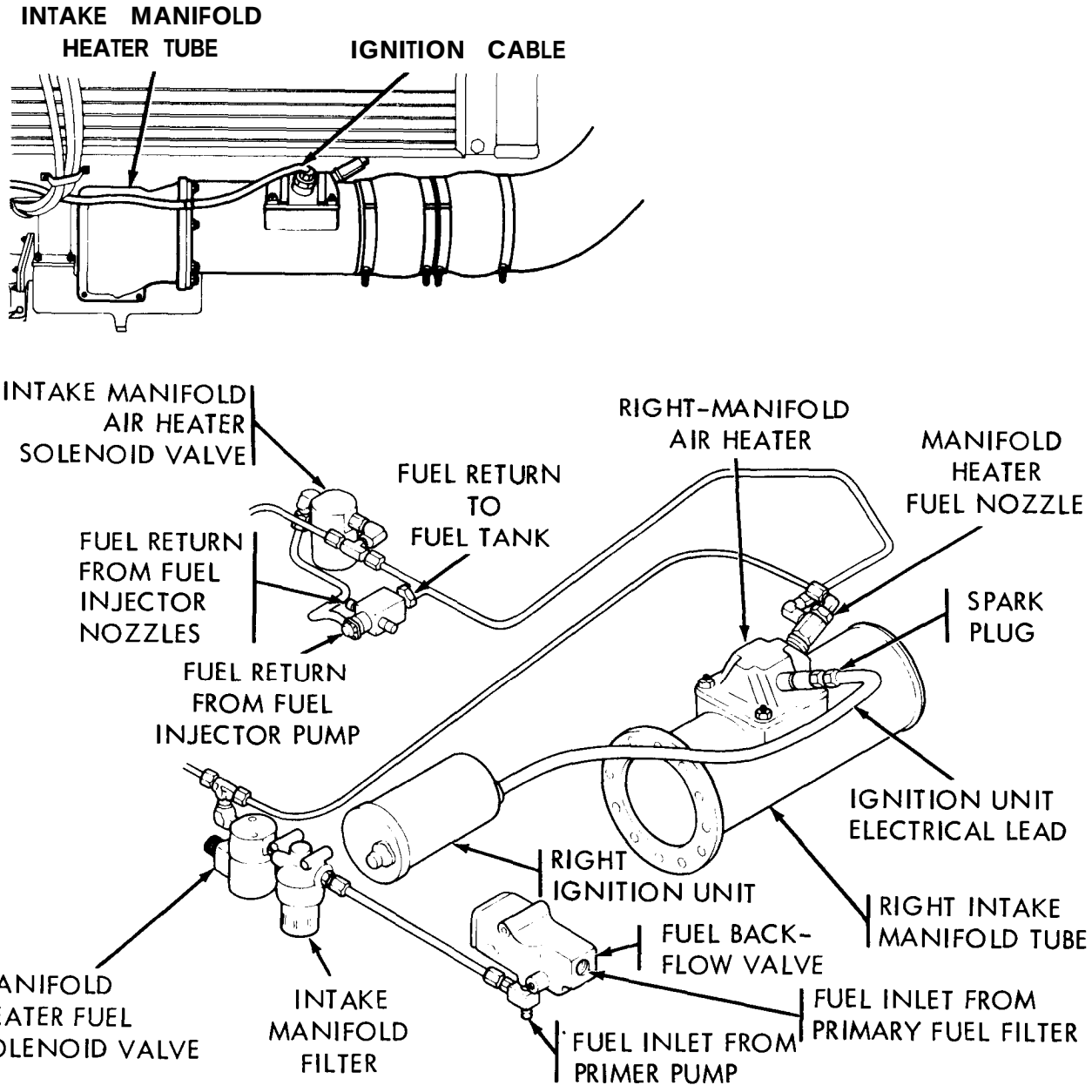


(A) AIR INTAKE HOSE
(B) REVERSIBLE AIR INTAKE
(C) AIR OUTLET HOSE
(D) AIR CLEANER TO TURBOSUPERCHARGER ELBOW

TA249777

SYSTEMS OPERATION - Continued

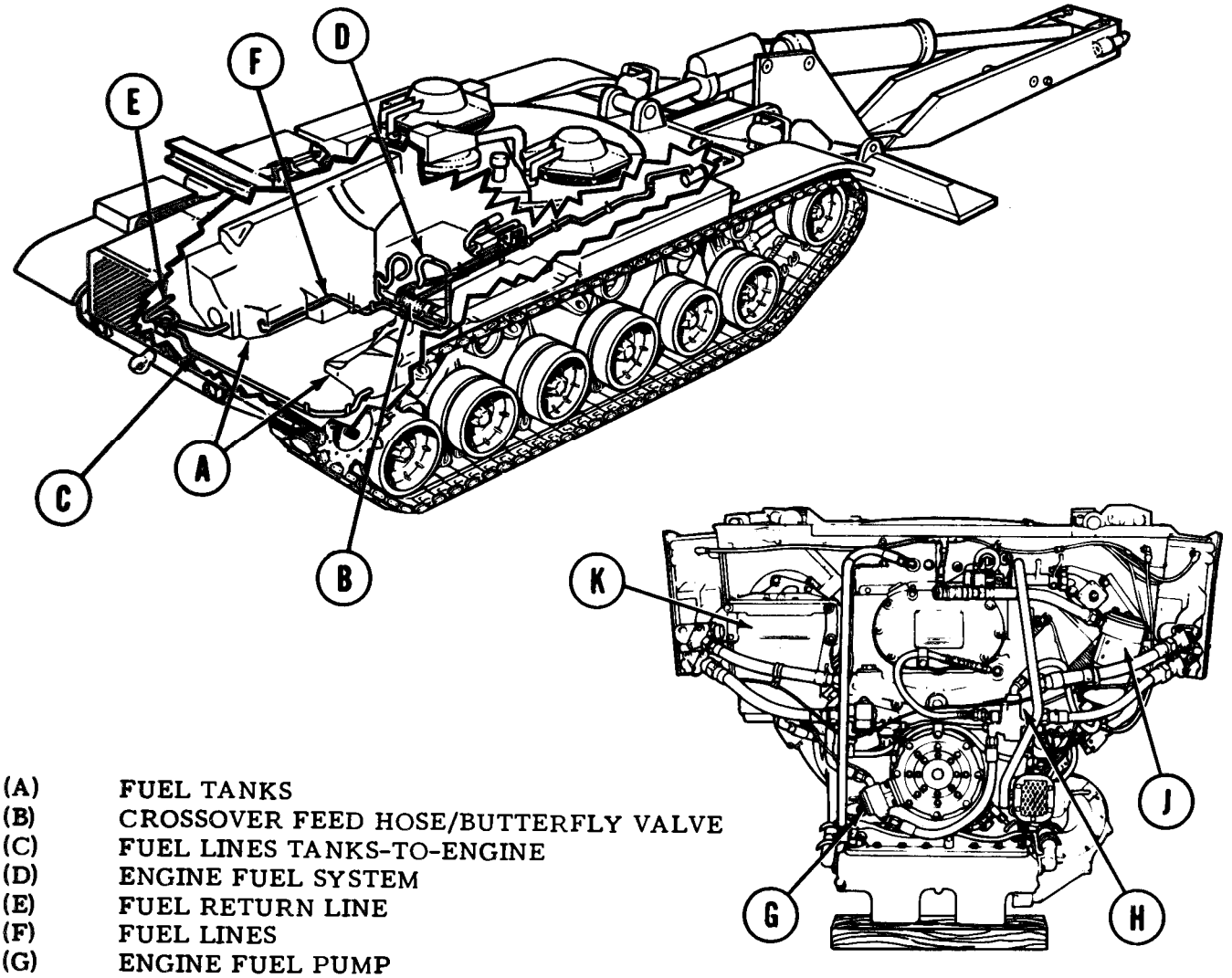
MANIFOLD HEATER. Manifold heater fuel system uses plastic and steel tubing to supply fuel from the primer pump pressure fuel line through the manifold heater fuel filter and manifold fuel heater solenoid valve to manifold heater nozzles. Excess fuel from nozzles is returned through intake manifold air heater solenoid valve to engine fuel return system. Heaters mounted on intake manifolds use a spark plug to ignite and burn pressurized engine fuel to provide heated air for cold weather starting.



TA249778

SYSTEMS OPERATION - Continued

FUEL TANKS AND DISTRIBUTION SYSTEM. Two aluminum fuel tanks, one on either side of engine compartment, are interconnected by a flexible cross-feed hose fitted with a butterfly valve. Hose and valve are located beneath turret subfloor. Twelve stainless steel fuel lines carry fuel under pressure from fuel pumps on fuel tanks to fuel injector nozzles in each cylinder head. Fuel leakage from nozzles is carried through fuel return tubes on each cylinder back to fuel return system to fuel tanks. Flexible fuel hoses and tubing are interconnected to carry fuel to powerplant and personnel heater. Electric fuel pumps in each tank force fuel through fuel lines to engine fuel system. Backflow valve between engine fuel pump and primary fuel filter retains fuel in engine fuel lines when engine is shut off.

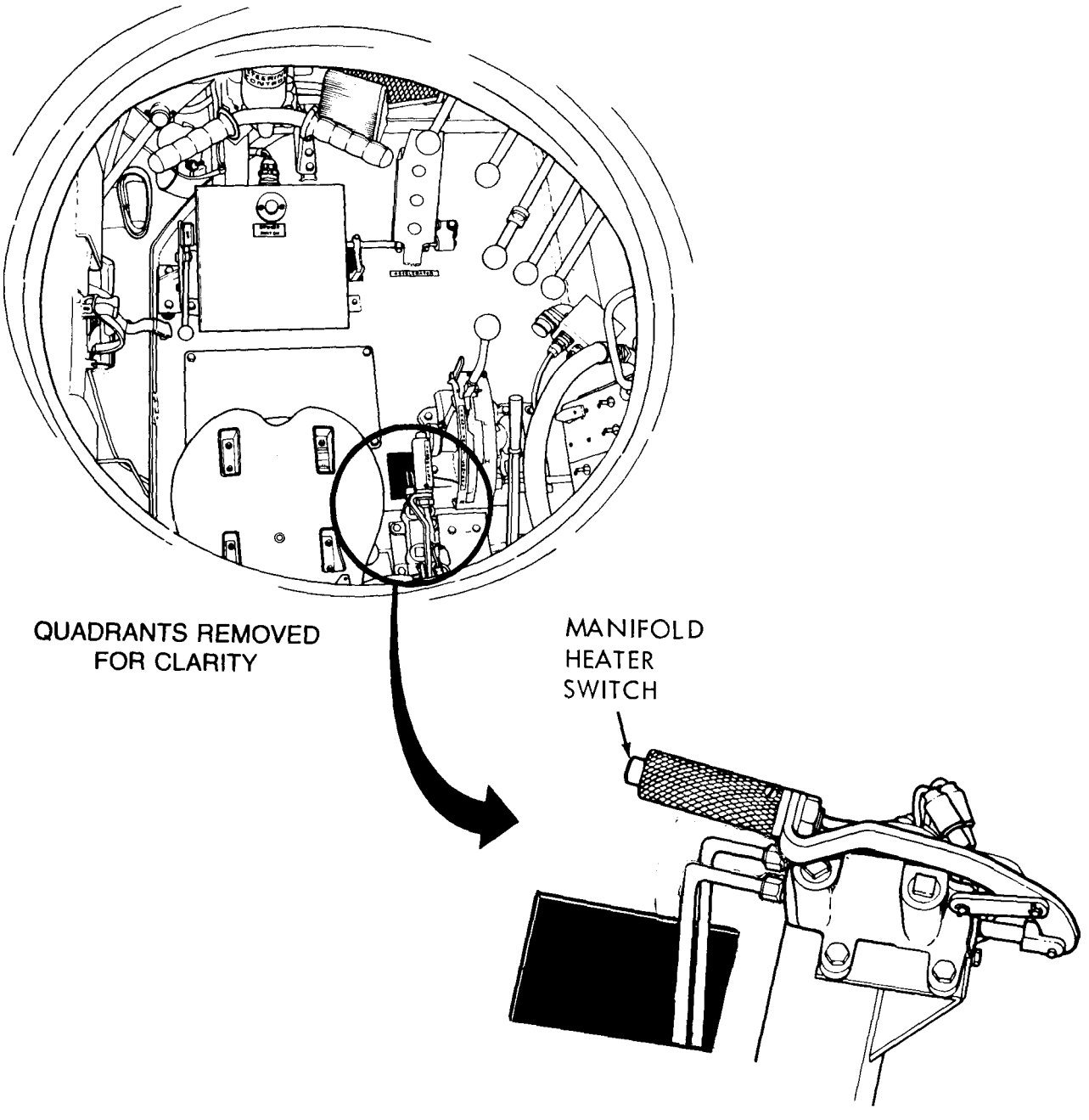


(A) FUEL TANKS
(B) CROSSOVER FEED HOSE/BUTTERFLY VALVE
(C) FUEL LINES TANKS-TO-ENGINE
(D) ENGINE FUEL SYSTEM
(E) FUEL RETURN LINE
(F) FUEL LINES
(G) ENGINE FUEL PUMP
(H) BACKFLOW VALVE
(J) PRIMARY FUEL FILTER
(K) FUEL/WATER SEPARATOR

TA249779

SYSTEMS OPERATION - Continued

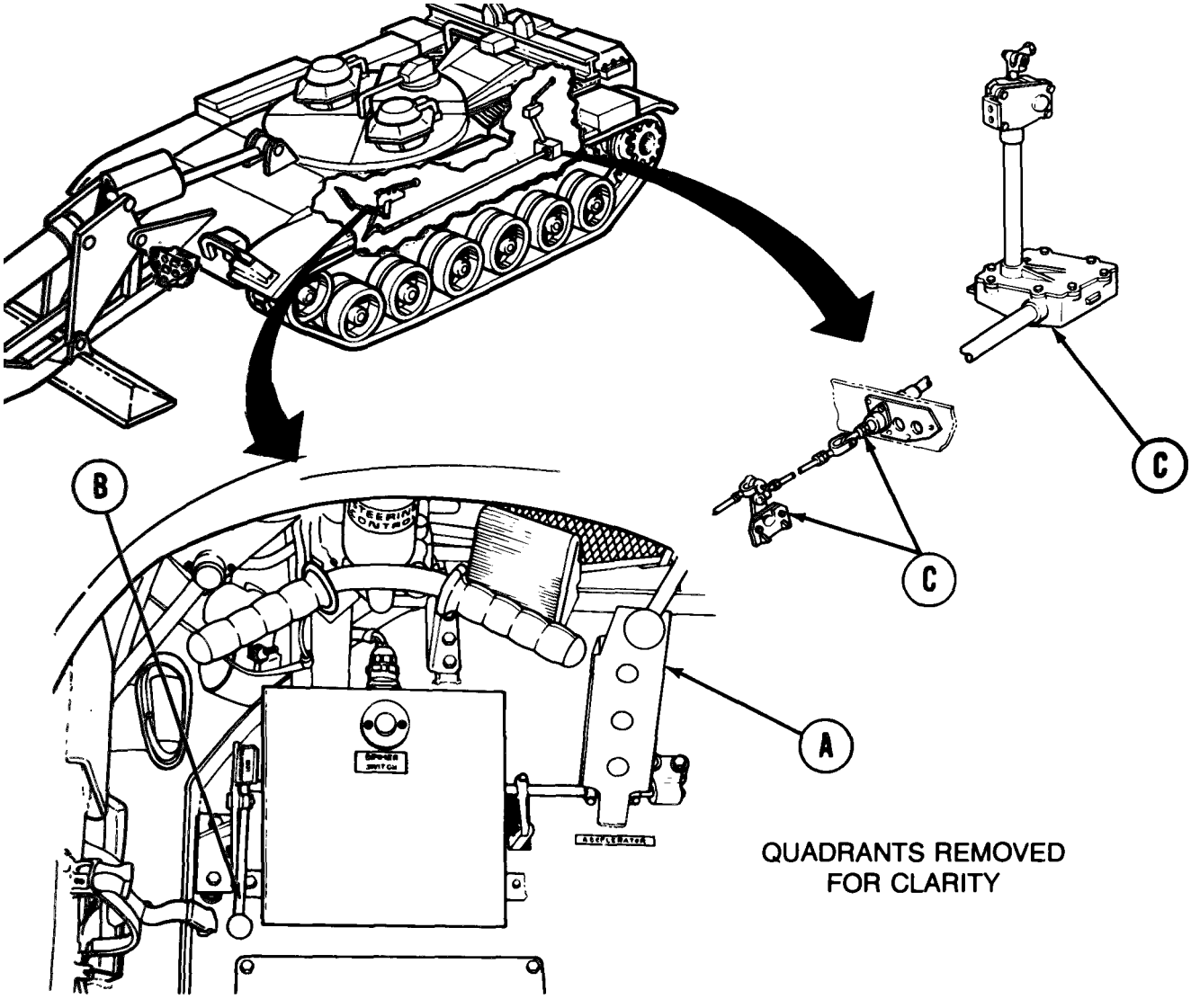
PRIMER PUMP. Provides pressurized fuel into engine fuel lines by driver-operated manual pump. Fuel is forced into manifold heater fuel lines and pump also purges fuel system of air. Air is forced into fuel tanks. Button on pump handle activates spark plugs on manifold heater system.



TA249780

SYSTEMS OPERATION - Continued

ACCELERATOR CONTROLS. Engine speed is controlled by accelerator control pedal and by a series of mechanical linkage. Accelerator linkage passes along hull floor and is connected with a yoke to an eye connection on engine accelerator linkage. An accelerator lock lever holds accelerator pedal in any required position. Adjustable return spring, mounted on accelerator linkage, returns pedal to up position when pedal or manual control lever is released.

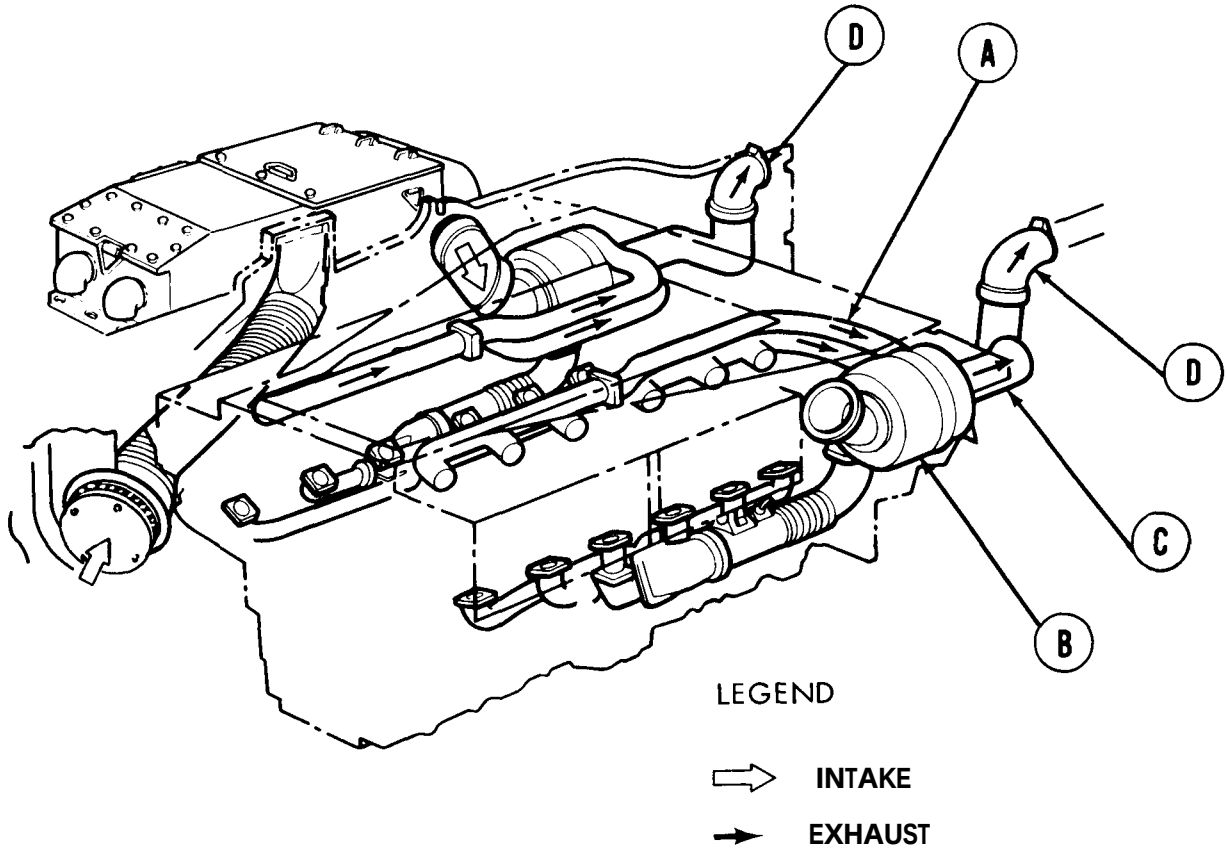


(A) ACCELERATOR PEDAL
(B) ACCELERATOR LOCK LEVER
(C) ACCELERATOR LINKAGE

TA249781

SYSTEMS OPERATION - Continued

EXHAUST SYSTEM. Exhaust gases from cylinders travel through a pair of exhaust manifolds into exhaust-driven turbosuperchargers and gases are expelled into a pair of exhaust pipe assemblies that conduct gases upward through transmission shroud into outlet elbows, out engine exhaust doors and away from vehicle.



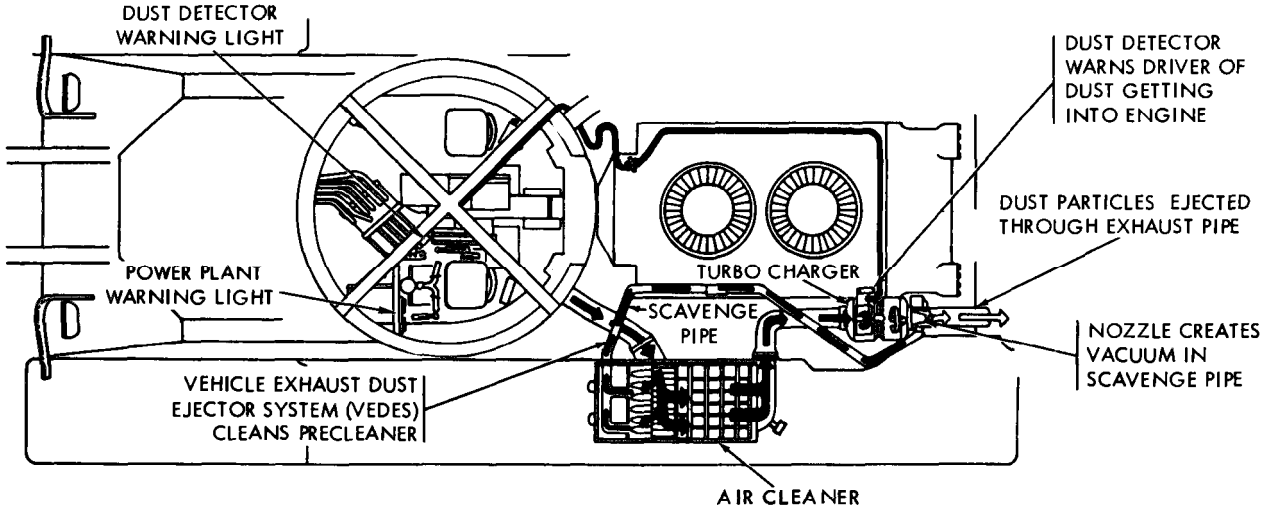
EXHAUST SYSTEM

(A) EXHAUST MANIFOLD
(B) TURBOSUPERCHARGER
(C) EXHAUST PIPE
(D) EXHAUST OUTLET ELBOW

TA249782

PRINCIPLES OF OPERATION - Continued

VEHICLE EXHAUST DUST EJECTOR SYSTEM (VEDES). The vehicle exhaust dust ejector system (VEDES) replaces the air cleaner centrifugal fans. The air cleaner housing is modified to plug the fan exhaust elbows and to accommodate a tube manifold with its associated hoses, clamps, and mounting bracket installed in place of the fans. A system of dust scavenger tubes, check valves, and exhaust pipes with integral dust ejectors is mounted along each cylinder bank above and parallel to the engine and transmission oil coolers. VEDES scavenges dust from the precleaned section of the air cleaners through suction action of the exhaust ejectors.



DUST DETECTOR SYSTEM. The Dust Detector System is to alert the driver when the air induction system allows dust to bypass the filter.

The Dust Detector System uses engine air induction manifold pressure to circulate air through filter strips in the dust detectors mounted in the turbosupercharger compressor housings. When the filter strip(s) become clogged, the resultant change in pressure actuates a pressure switch which illuminates the powerplant warning light and the dust detector warning light in the driver's compartment.

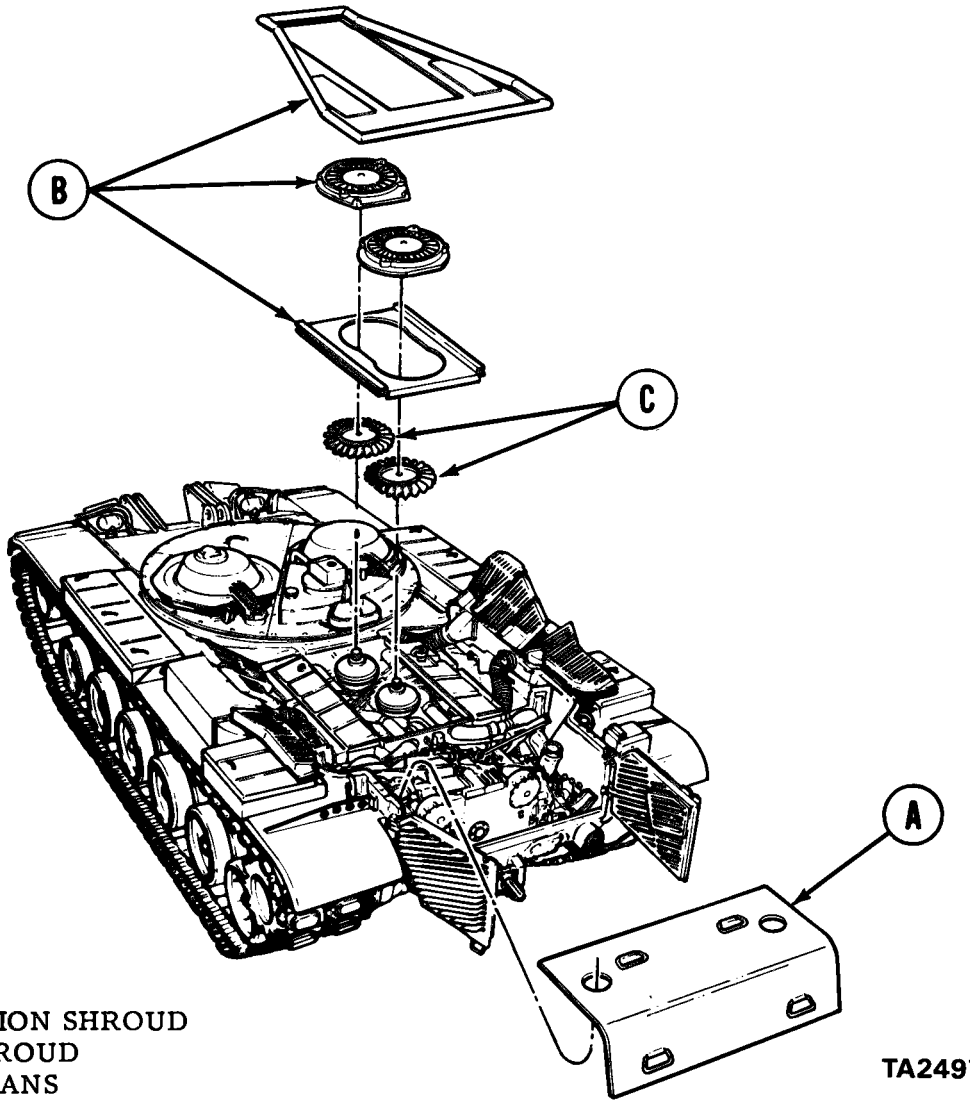
SYSTEMS OPERATION - Continued

COOLING SYSTEM. Air for cooling is drawn into engine compartment through air intake grille doors by two engine-mounted fans which draw air through engine and transmission oil coolers, over cylinder fins, and discharge air vertically from engine shroud. Baffles and deflectors on cooling fan shroud direct air flow across cylinders.

TRANSMISSION SHROUD. Insulated sheet metal assembly fitting over top and rear portions of transmission.

ENGINE SHROUD. Sheet metal assembly covering top of engine, guides hot air from engine cooling fans toward rear of tank. Removed with powerplant.

COOLING FANS. Mounted on oil-driven centrifugal clutch and disk towers on engine, fans draw air through engine and transmission oil cooler cores to cool circulated oil. Fans draw air over baffles and deflectors on engine and shroud to direct air flow across cylinders. Fans also force hot air and exhaust gases through exhaust doors.



(A) TRANSMISSION SHROUD
(B) ENGINE SHROUD
(C) COOLING FANS

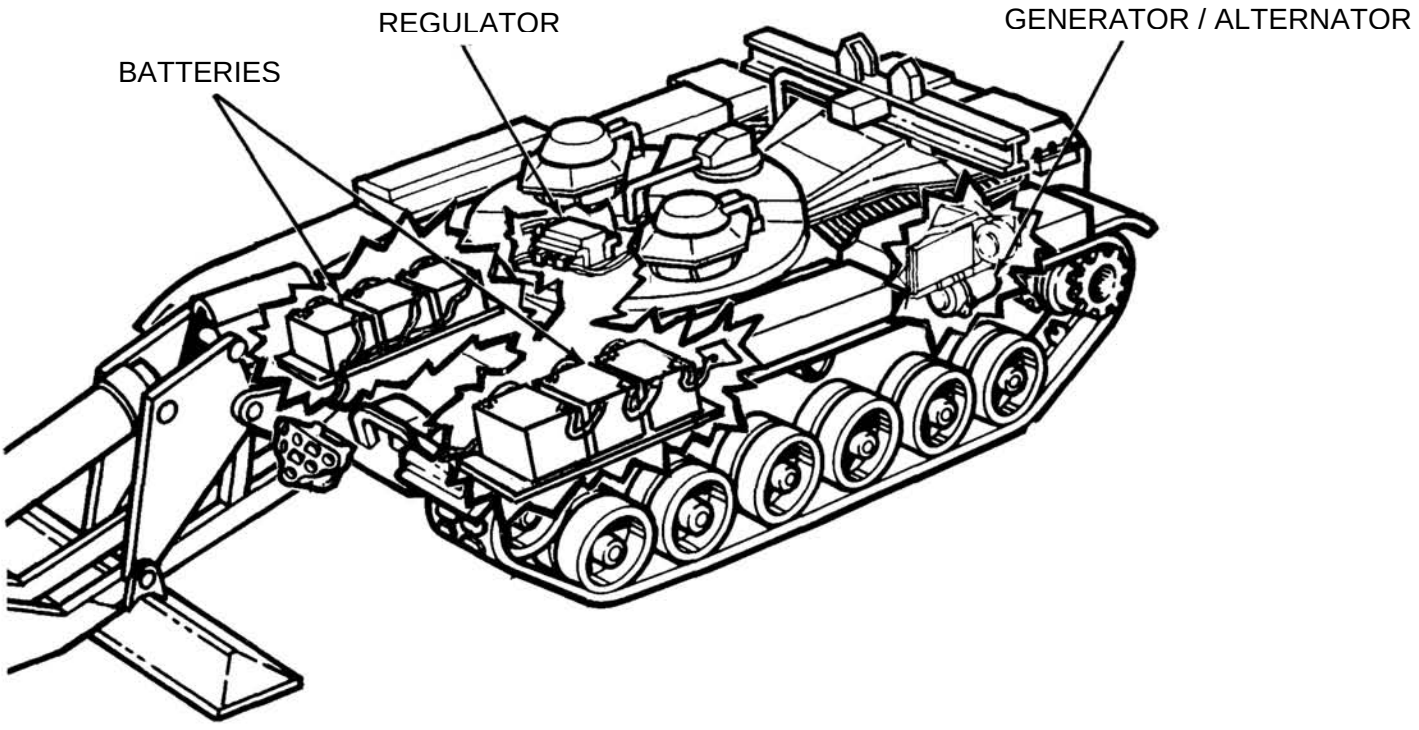
TA249783

SYSTEMS OPERATION - Continued

ELECTRICAL SYSTEM. An interrelated system of electrical components, consisting of starting system; charging system (batteries and generating system); lighting, including infrared lighting; electrical controls and gages; warning lights, switches, and transmitters; and various relays, circuit breakers, switches, and receptacles, all interconnected by wiring harnesses, cables, and leads located throughout tank hull and on engine and transmission. Repair of harnesses and powerplant wiring is limited to replacement of faulty connectors and to substitution of jumper wires for defective harness wires.

CHARGING SYSTEM. 28-volt, 300-ampere air-cooled generator produces direct current electrical output through voltage regulator to batteries. Regulator acts as reverse current relay preventing current flow back to generator when battery voltage exceeds generator output. Series parallel connected batteries supply direct current electrical power to master relay and starter relay.

CHARGING SYSTEM (HEU Configuration). 28-volt, 650-ampere oil-cooled alternator produces direct current electrical output, regulated by a voltage regulator, to batteries. Series parallel connected batteries supply direct current electrical power to master relay and starter relay.

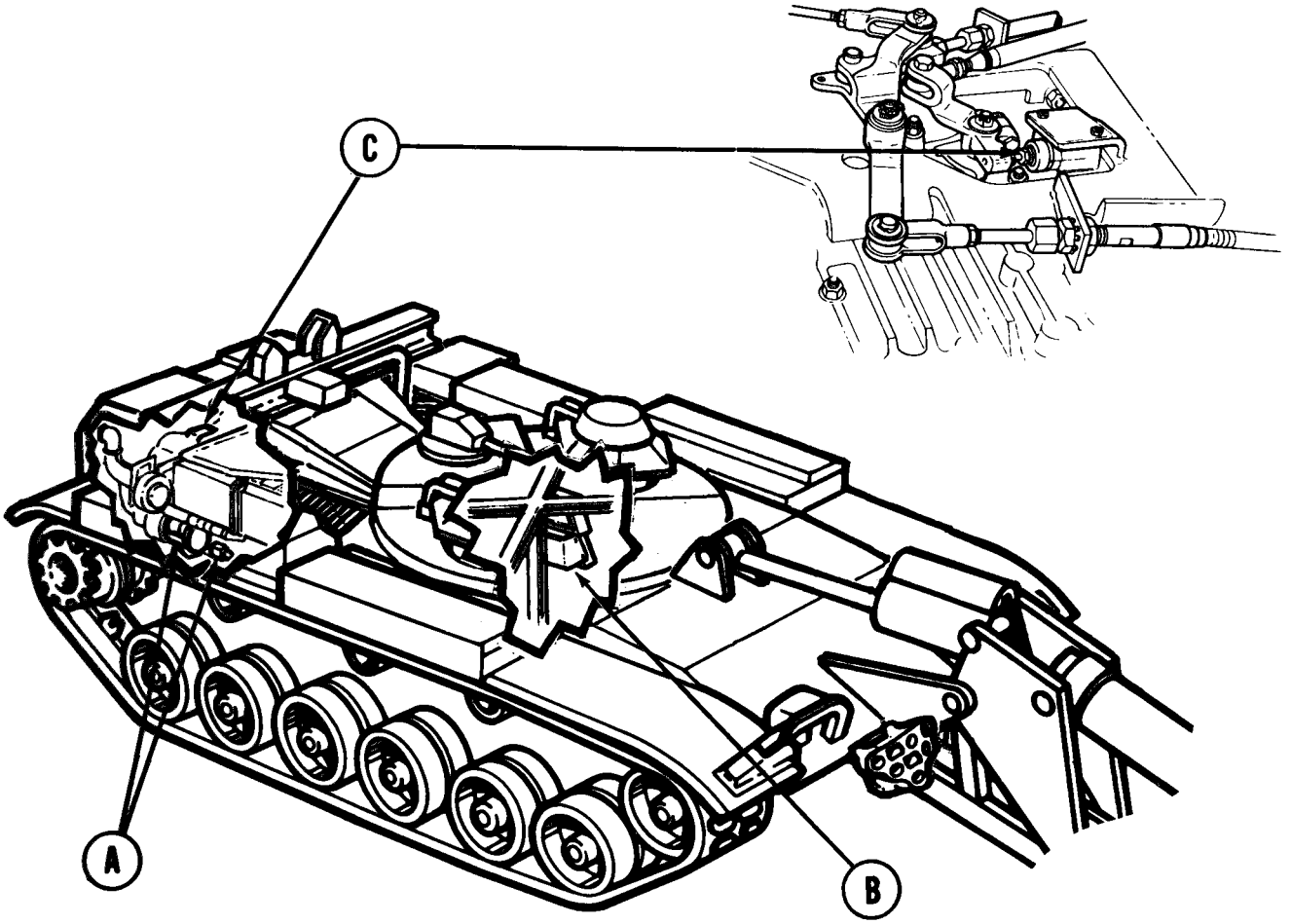


CHARGING SYSTEM

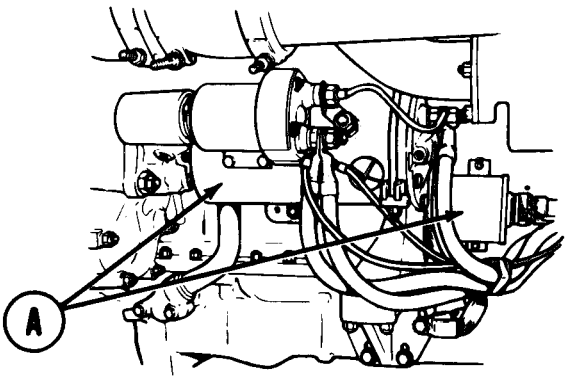
TA249784

SYSTEMS OPERATION - Continued

STARTING SYSTEM. Heavy-duty solenoid-operated starter is actuated by a starter button on the master control panel. Starter will not activate if neutral shift switch on transmission is not in neutral (N) or park (P) position. Starter low-voltage relay solenoid prevents energizing starter when battery voltage is below 11.75 volts.

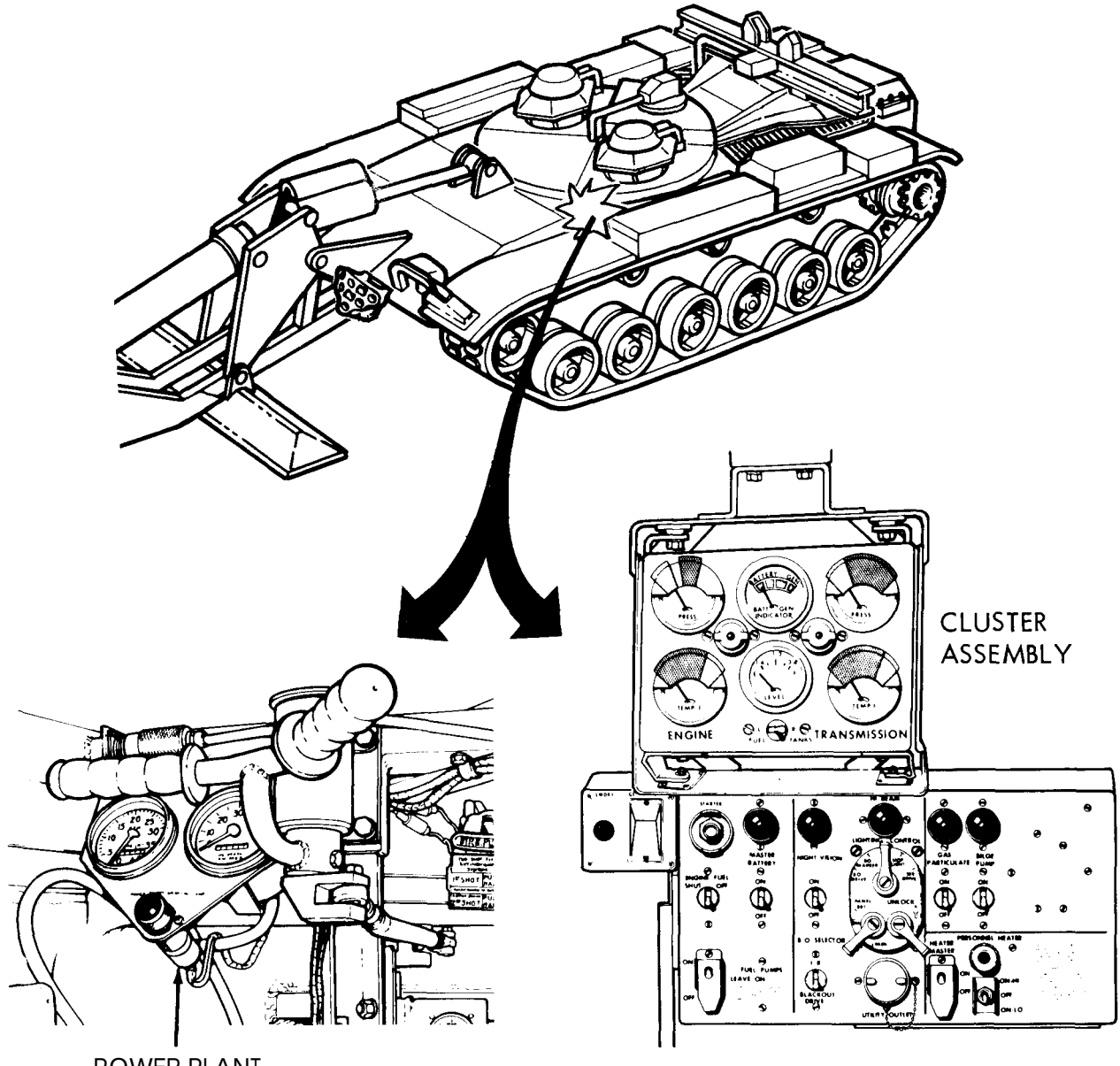


(A) STARTER AND LOW VOLTAGE RELAY SOLENOID
(B) STARTER SWITCH (MASTER CONTROL PANEL)
(C) NEUTRAL SHIFT SWITCH



TA249785

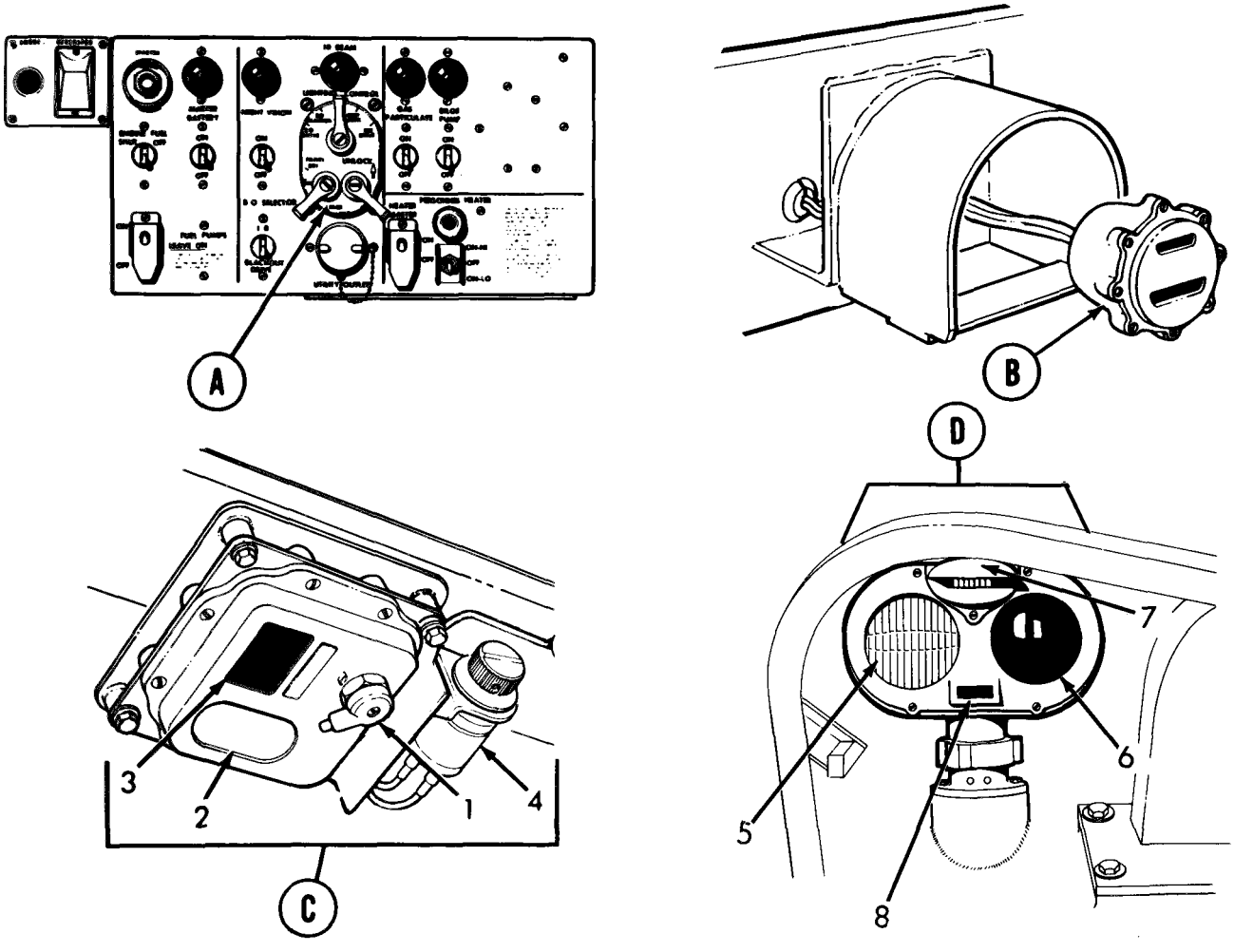
INDICATORS, GAGES, AND CONTROLS. Master control panel contains switches, indicator lamps, and automatic-reset circuit breakers to control operation of various systems in hull. Cluster assembly contains engine and transmission oil temperature and pressure indicators, battery-generator indicator, fuel level indicator, fuel tank level switch, and indicator lights. Variable resistance type transmitters in engine and transmission oil systems provide electrical signals to drive oil temperature and pressure indicators. Mechanically actuated rheostats connected to fuel level circuit in fuel tanks vary electrical current to fuel tank indicator. Powerplant warning light is actuated by temperature and pressure-sensitive switches on engine and transmission when oil pressure falls or temperatures are beyond safe limits.



TA249786

SYSTEMS OPERATION - Continued

LIGHTING SYSTEM. Vehicle lighting consists of headlights and taillights that are controlled by the LIGHTING CONTROL switch on the MASTER CONTROL PANEL. Headlight assemblies have service drive and infrared-filtered blackout lamps and marker lamps. Service drive and stop lamps are in left taillight and blackout lamps are in both right and left taillights. Domelight is controlled by a three-position switch to select white or red light and turn domelight off.

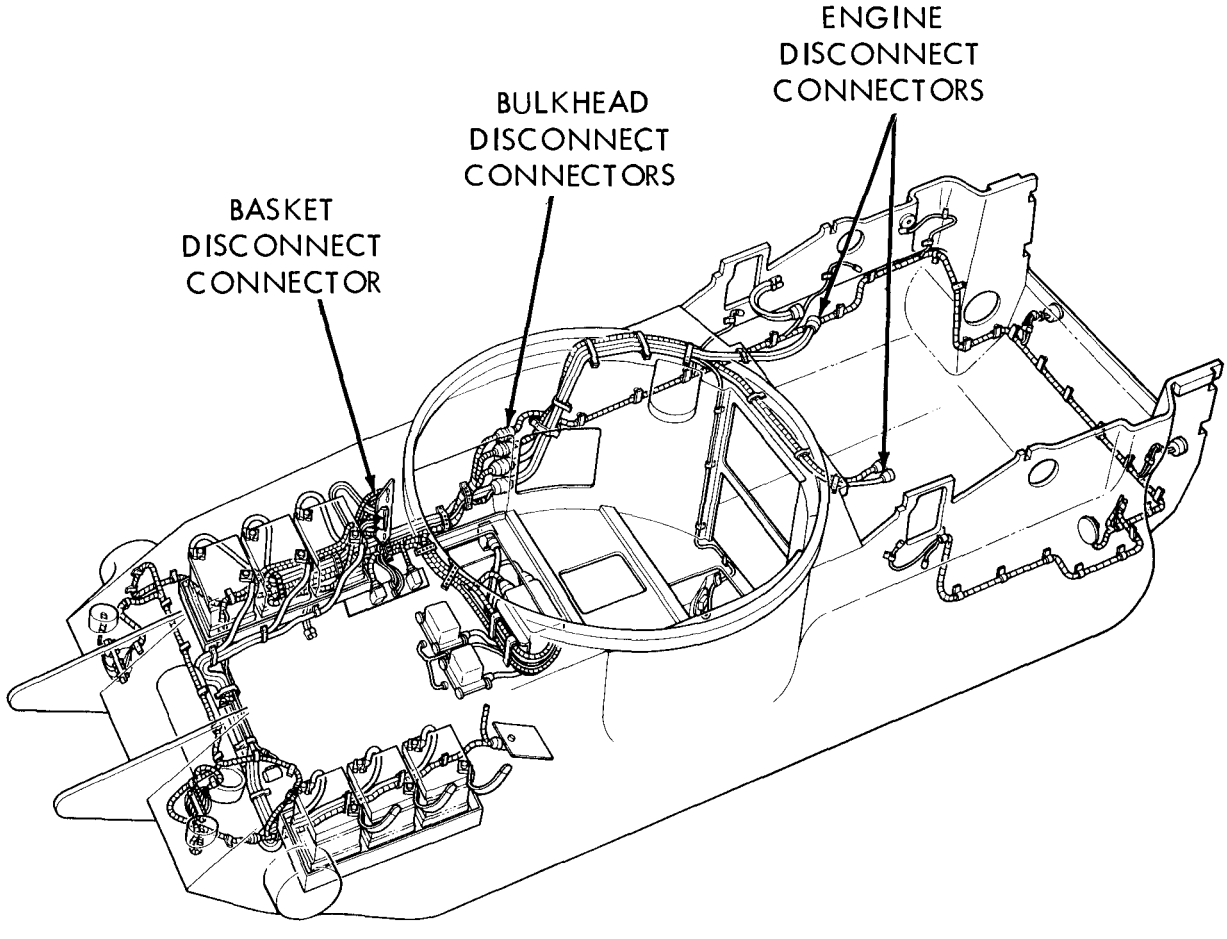


(A) LIGHTING CONTROL (MASTER CONTROL PANEL)
(B) TAILLIGHT-STOPLIGHT-BLACKOUT LIGHT ASSEMBLY
(C) DOMELIGHT
1. THREE-POSITION SWITCH
2. WHITE LIGHT
3. RED LIGHT
4. DOMELIGHT RESISTOR
(D) HEADLIGHT ASSEMBLY
5. SERVICE DRIVE LAMP
6. INFRARED LIGHT
7. BLACKOUT DRIVE
8. BLACKOUT MARKER

TA249787

SYSTEMS OPERATION - Continued

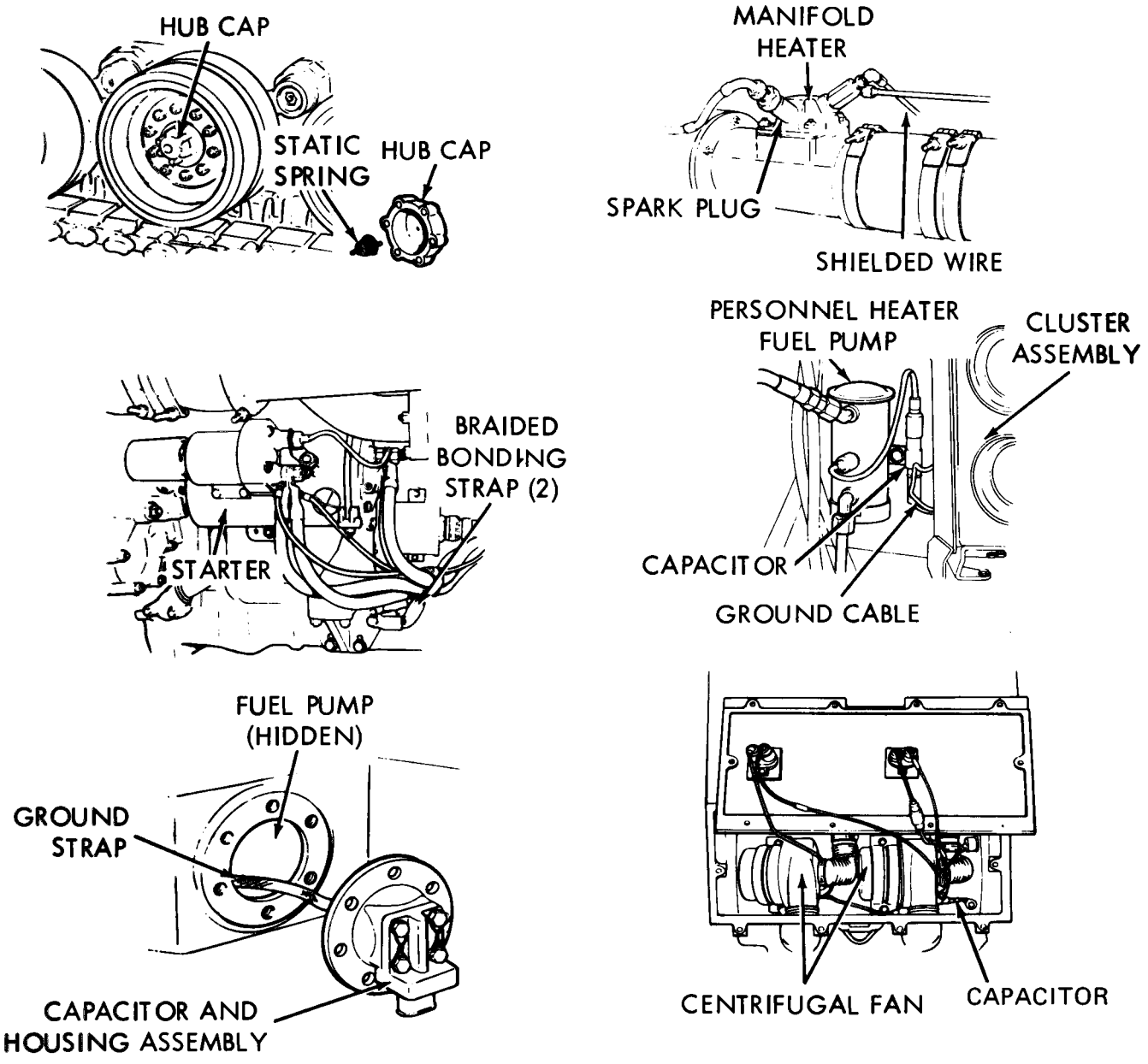
HULL WIRING HARNESSES/CONNECTORS. Various electrical components are interconnetted by wiring harnesses, cables, and leads terminated in most instances by plug-in connectors and couplings. Wiring harnesses between crew and engine compartments are terminated at connector mounting plate on right side of hull interior and at the basket disconnect. Wiring harness connectors at top of engine permit quick disconnecting of starting , and charging systems from powerplant.



TA249788

SYSTEMS OPERATION - Continued

RADIO INTERFERENCE SUPPRESSION. Stray electrical currents must be prevented from building up between components and wiring harnesses to eliminate radio interference. Stray currents, if allowed to build up and spark (arc to a ground), will cause noise in, and possibly disrupt, radio communications. Electrical currents can also produce signals that may interfere with vehicle equipment sensitive to small changes in power or, in extreme cases, give off signals strong enough to give away location. Interference is eliminated by providing low resistance paths to ground for stray currents and by using shielded wiring. Low resistance components include capacitors, tooth-type lockwashers, grounding springs, and



TA249789

SYSTEMS OPERATION - Continued

TRANSMISSION. Cross-drive transmission is controlled by driver with steering and shifting controls and brake pedal. Transmission hydraulic torque converter multiplies engine torque providing automatically variable torque output through planetary gearsets and hydraulically operated clutches and bands to final drive units, sprockets, and tracks.

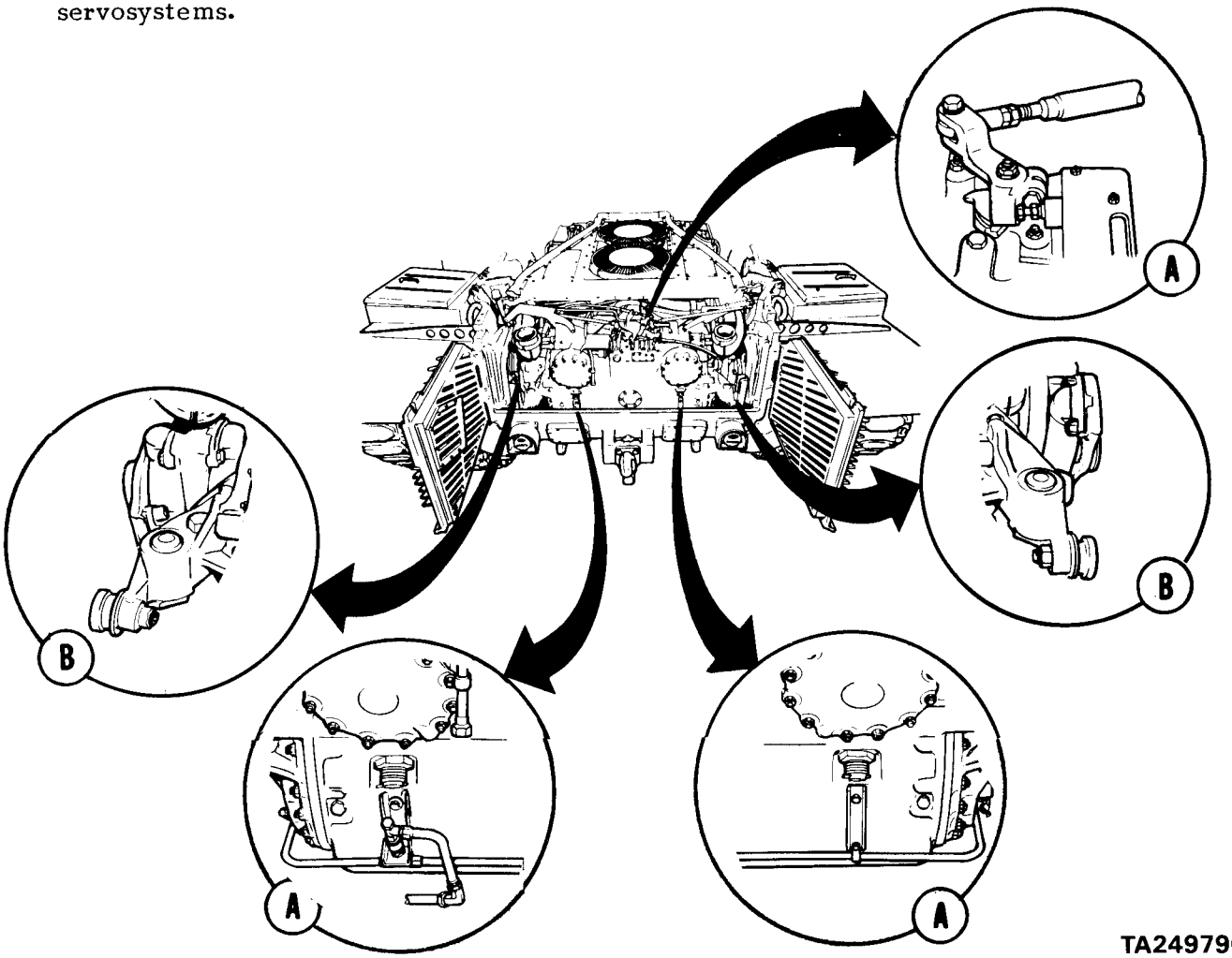
Refer to page 2-21.

A. TRANSMISSION ADJUSTMENTS. Adjustments are made to mechanical linkages on rear of transmission.

B. TRANSMISSION MOUNTS. Located one each side of transmission serve as powerplant installation guides and mounts.

C. TRANSMISSION OIL COOLER. Oil flowing through oil coolers on each side of engine is cooled by air drawn in by engine cooling fans. Cooled oil flows through main oil supply line, and flow control thermostats in coolers stop oil circulation until oil is at operating temperature.

D. SHIFTING CONTROLS. Shifting controlled by shift lever through system of mechanical links to transmission shift valve that hydraulically controls transmission driving range servosystems.



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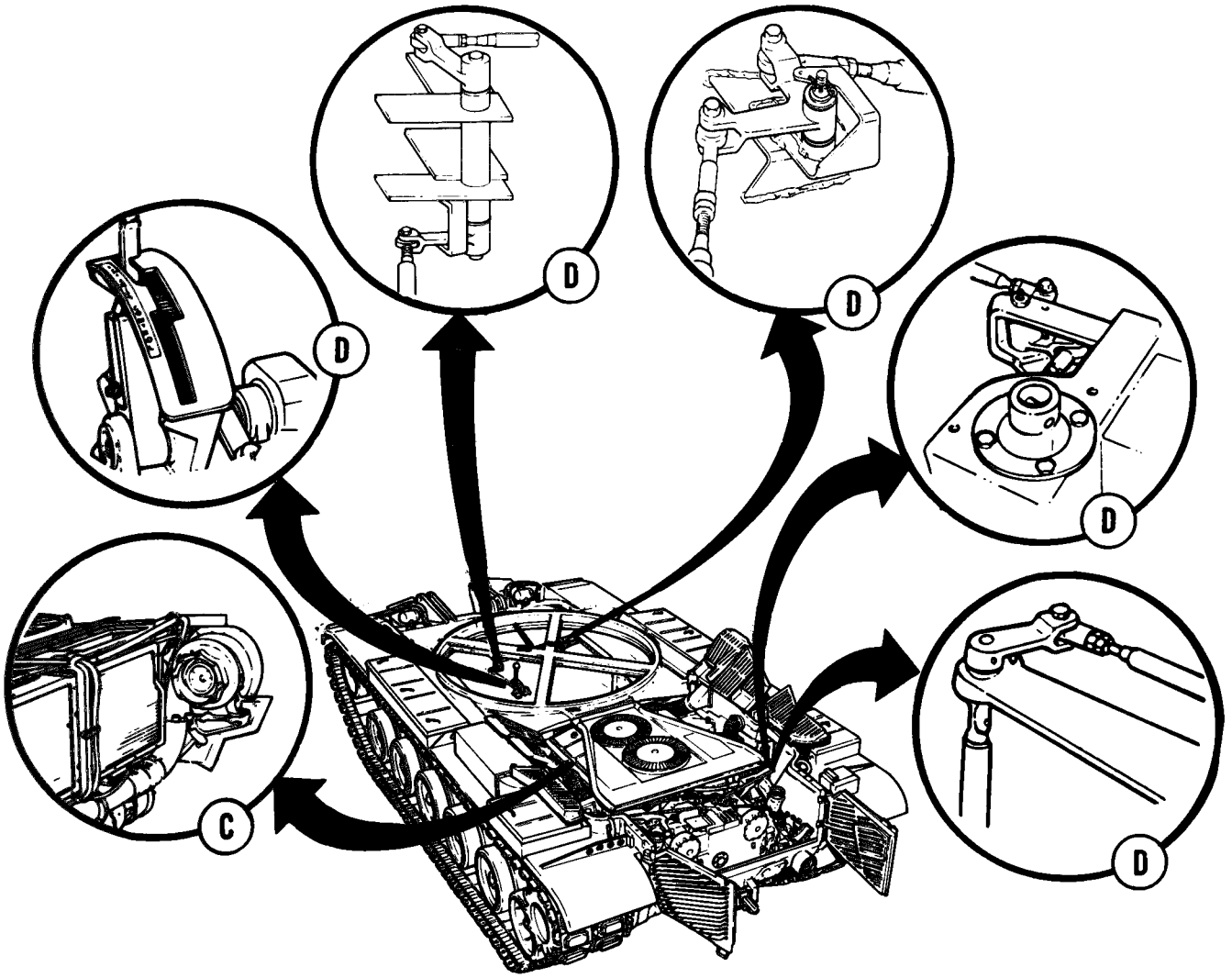
SYSTEMS OPERATION - Continued



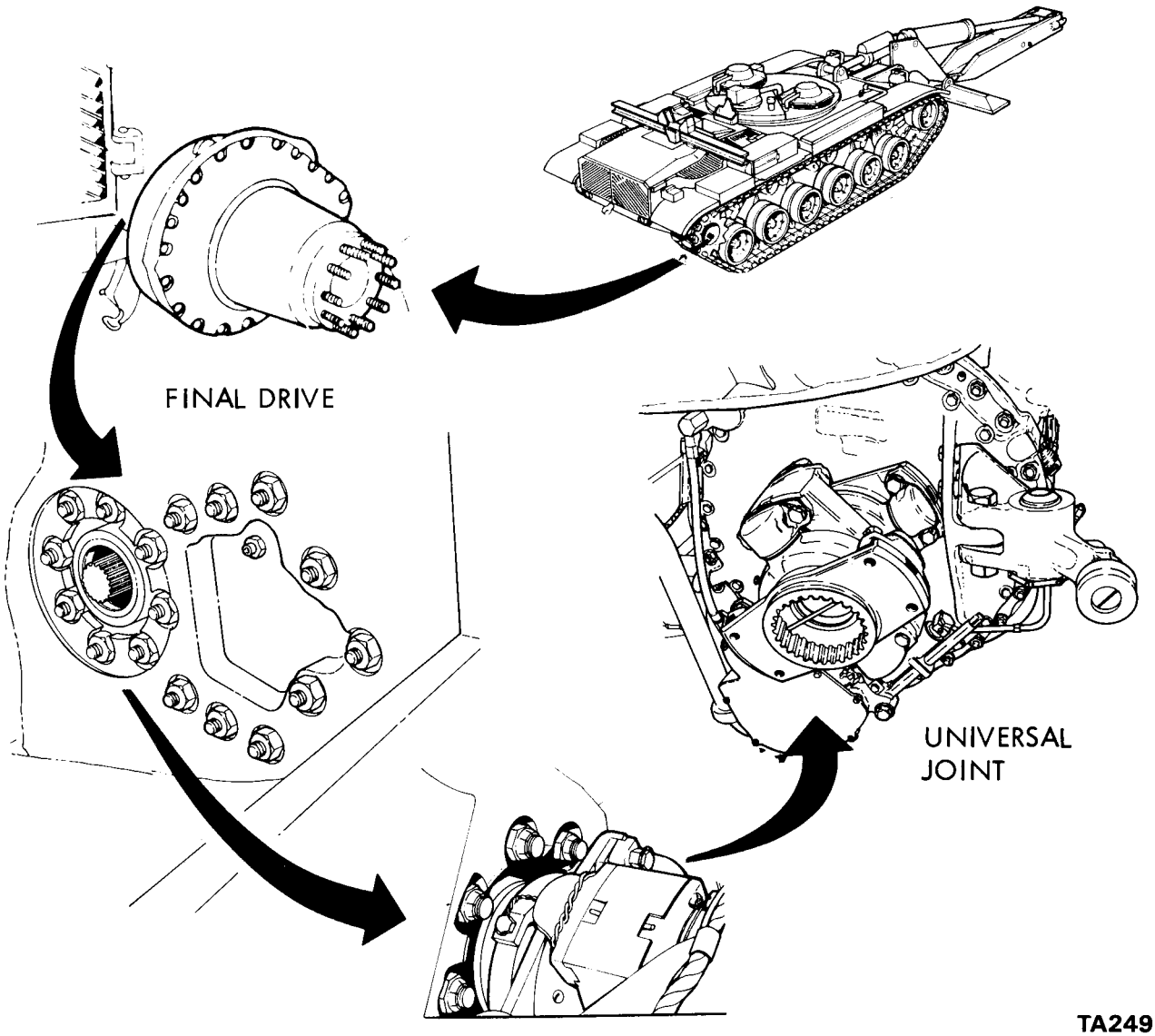
TA249791

SYSTEMS OPERATION - Continued

FINAL DRIVE AND COUPLING (UNIVERSAL JOINT). Power from two transmission output flanges is transmitted through universal joints and two final drive units and sprockets. Teeth of drive sprockets mesh with track link end connectors on both sides of track to move vehicle along track.

FINAL DRIVE. Identical single-stage, 5.08:1 gear ratio, speed reduction units. Gears operate in closed housing and are splash lubricated. Input pinion gear shaft is mated to universal joint by removable adapter. External teeth on adapter fit into internal splines in universal, and hollow shaft of adapter is splined to mate with final drive input gear shaft in final drive unit.

UNIVERSAL JOINT. Compensates for up to 7 degrees misalinement of transmission with final drive. Splined flange connects with final drive adapter on transmission. Universal joint is bolted to transmission output flange.



TA249792

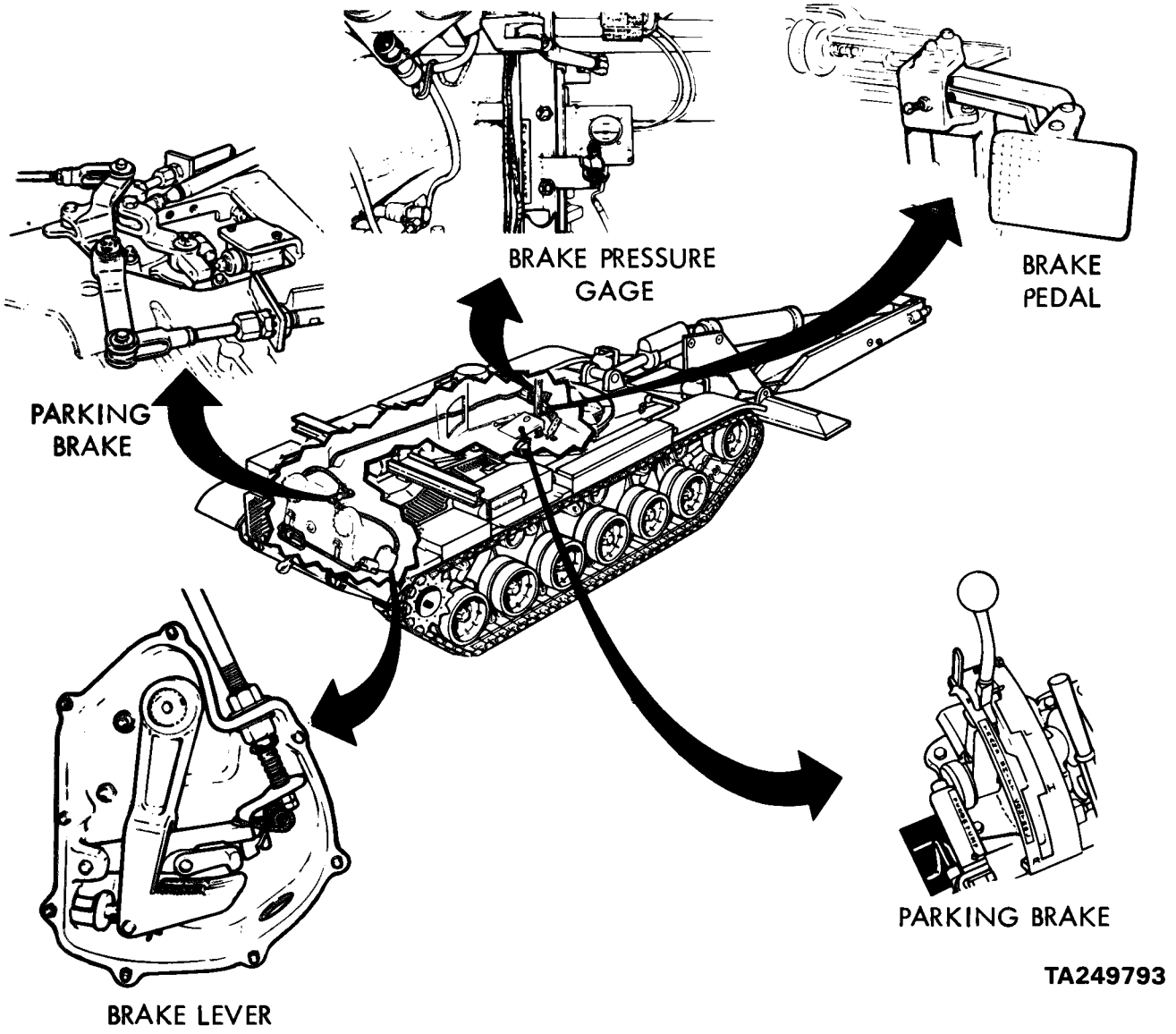
SYSTEMS OPERATION - Continued

BRAKE SYSTEM. Consists of brake control pedal connected to hydraulic brake and mechanical locking arrangement for parking.

ADJUSTMENT. Brake adjusting worm on transmission end covers is used when linkages have been disturbed. Adjusting brakes is done by bleeding hydraulic system at master cylinders and slave cylinders, or by adjusting braking controls and linkages on transmission.

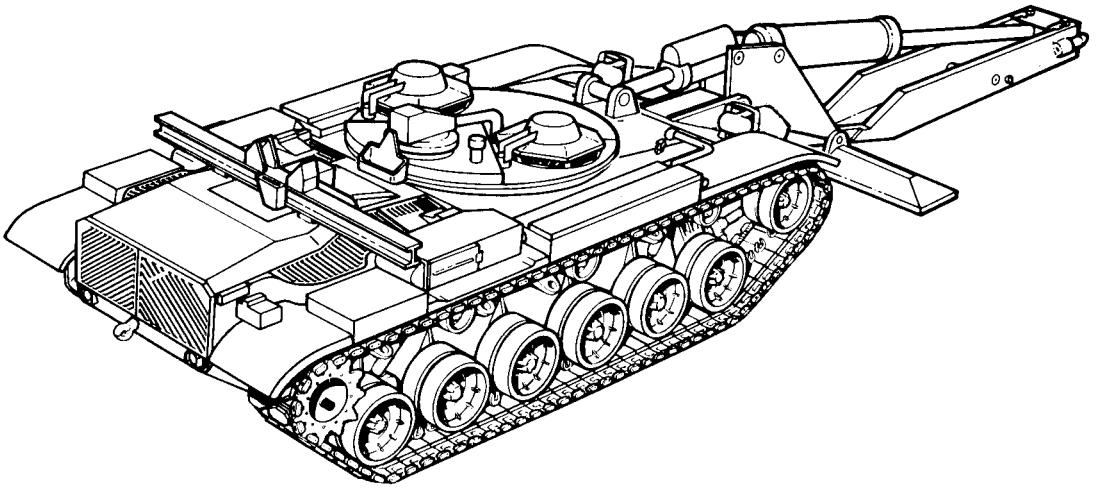
HYDRAULIC SYSTEM. Brake pedal mechanically linked to master cylinder forces hydraulic fluid through lines to two hydraulic slave cylinders on transmission that apply force to brake levers attached to brake apply shafts on transmission.

PARKING BRAKE SYSTEM. Lever and cam attached to shifting pedestal actuates cable to transmission fittings which lock brake levers by means of a ratchet mechanism when shifting lever is moved into park (P) position.



SYSTEMS OPERATION - Continued

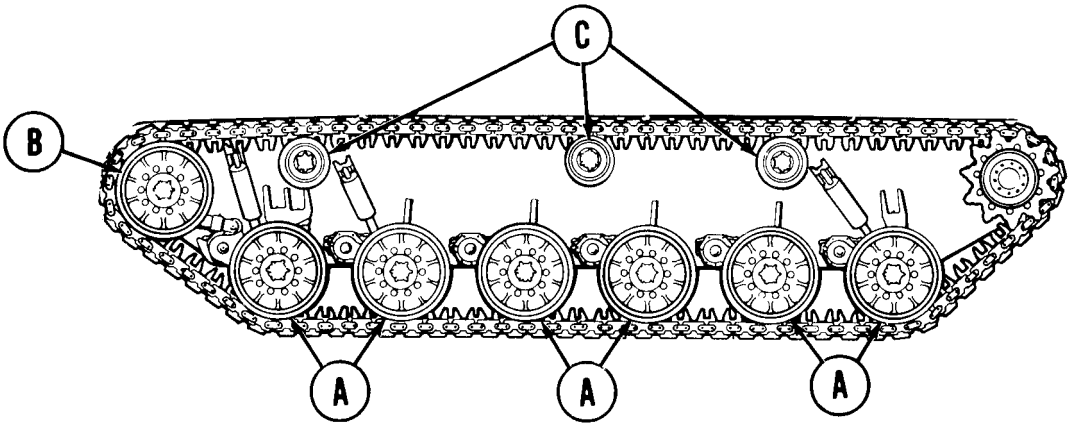
TRACKS AND SUSPENSION SYSTEM. Major components of the track and suspension system are described below.



(A) ROADWHEELS AND SUSPENSION. Twelve roadwheels, dual-mounted on six hubs, **carry** vehicle weight on upper surface of lower track span. Space between dual-mounted wheels is running channel for track alining centerguides. Roadwheel arms 1, 2, and 6 bear shock absorber mounts. Each arm is sprung with torsion bars.

(B) COMPENSATING IDLER WHEELS. Identical to and interchangeable with roadwheels, serves as track alining channel for centerguides and maintains track tension by means of track adjusting link connected to roadwheel number one and idler arm which forces idler wheel forward or rearward to maintain constant tension on unloaded free portion of track.

(C) TRACK SUPPORT ROLLERS. Three dual-mounted track support rollers on each side of vehicle support upper track span between sprockets on drive hub and compensating idler wheels. One track support roller also drives the speedometer.

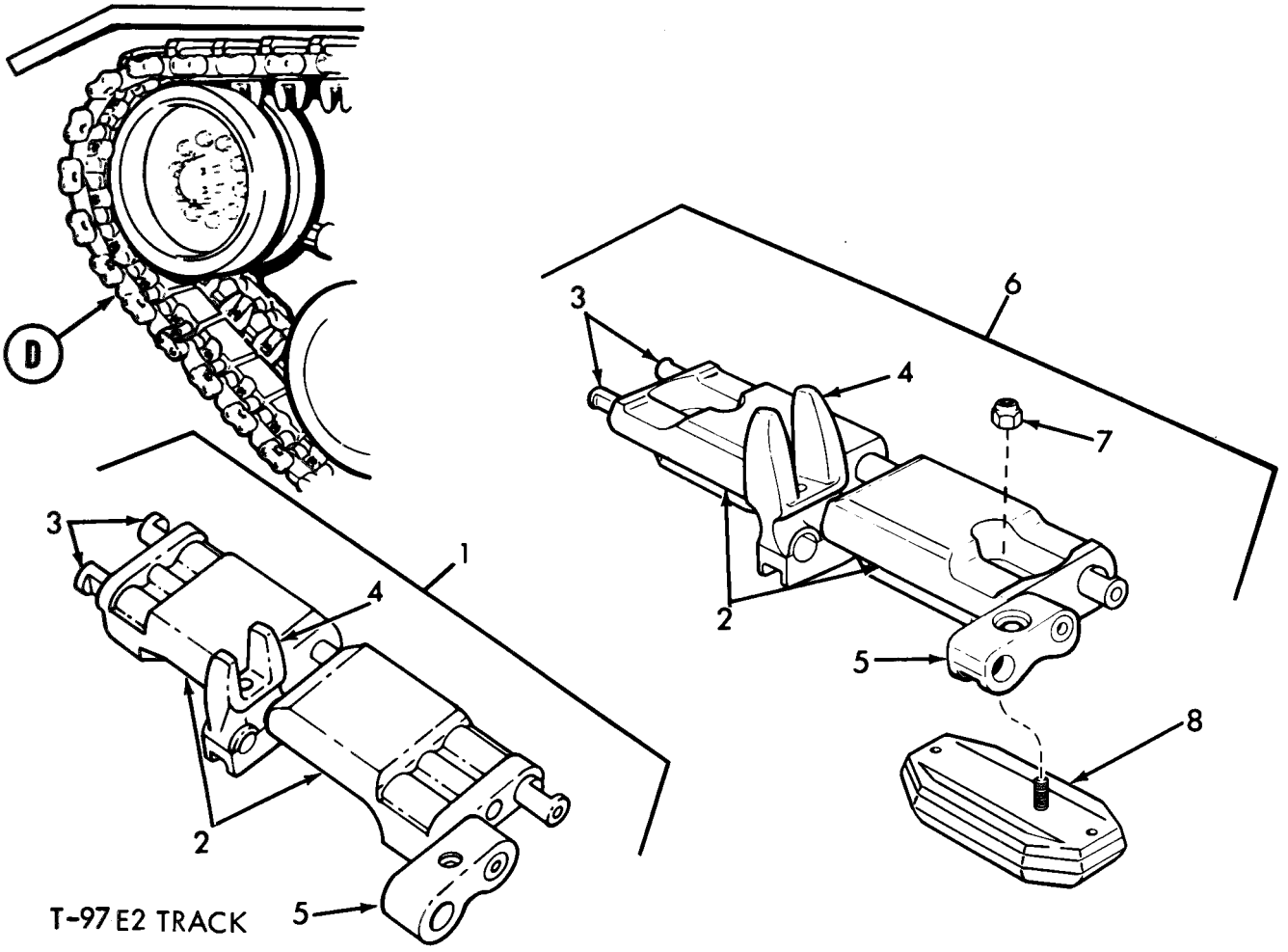


(A) ROADWHEELS
(B) COMPENSATING IDLER WHEELS
(C) TRACK SUPPORT ROLLERS

TA249794

SYSTEMS OPERATION - Continued

(D) TRACK. Composed of 80 track links fastened together with end connectors and steel centerguides. Each link consists of two grousers, two link pins, and two rubber pads. Alinement maintained by 80 centerguides riding between dual track support rollers, dual-compensating idler wheels, dual roadwheels and through channel in track drive sprocket hub. End connectors on both sides of track form track driving chain as they pass around drive sprocket. The vehicle may be equipped with either (but not both) T-97E2 track or T-142 track. T-97E2 track has replaceable links and the T-142 has replaceable pads.



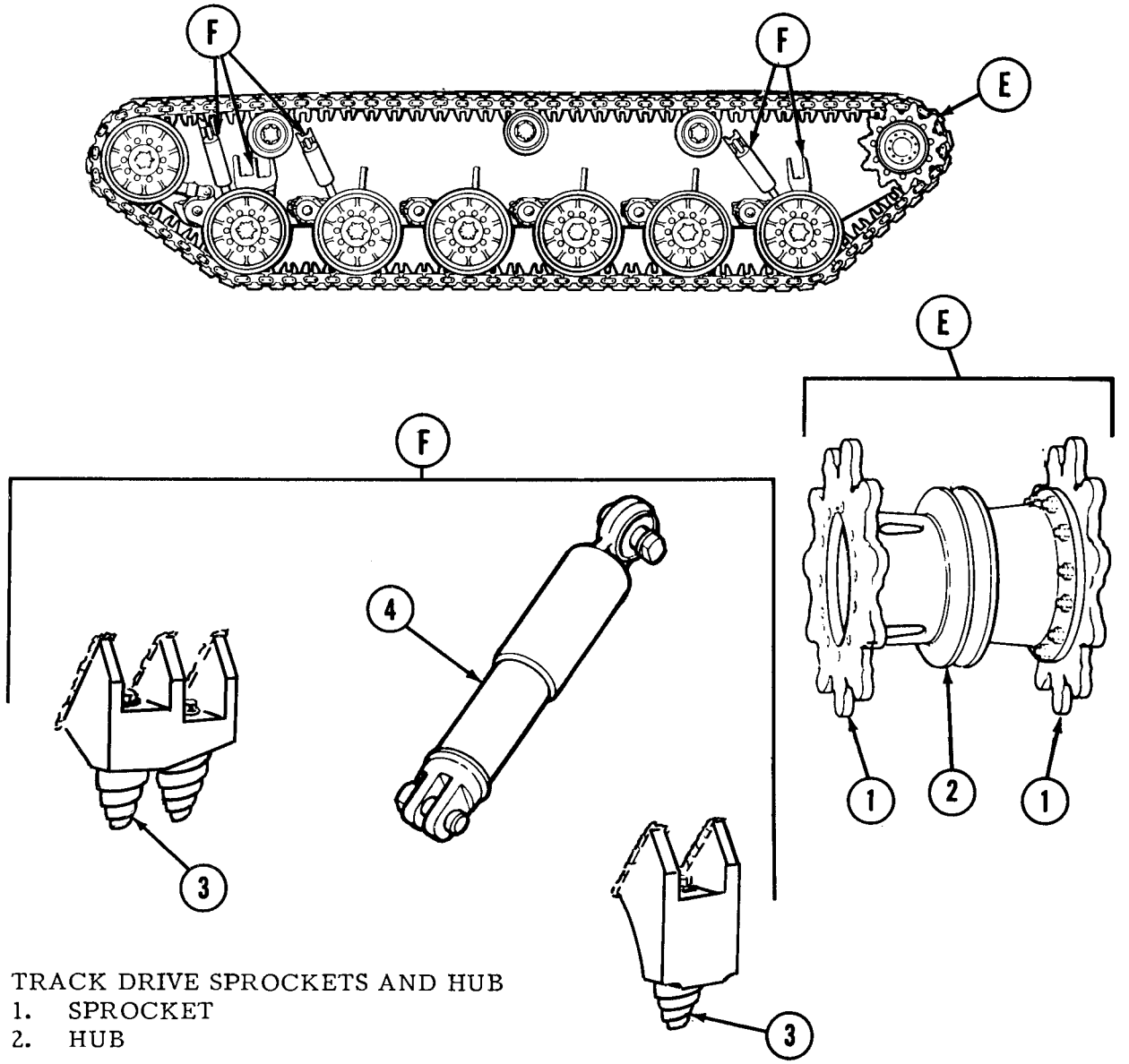
(D) TRACK
1. TRACK LINK - T97E2
2. GROUSER
3. LINK PINS
4. CENTERGUIDE
5. END CONNECTOR
6. TRACK LINK - T142
7. TRACK PAD MOUNTING NUT
8. TRACK PAD

TA249795

SYSTEMS OPERATION - Continued

(E) TRACK DRIVE SPROCKETS AND HUB. Hub transmits torque from final drive output shafts on each side of vehicle hull to sprockets bolted to hub. Sprockets mesh with end connectors on inner and outer edges of track to move track forward over track support rollers and roadwheels.

(F) VOLUTE BUMP SPRINGS AND SHOCK ABSORBERS. Bump springs mounted at roadwheels 1 and 6 on both sides of hull cushion roadwheel arms into bump stops welded to hull when arm displaced to full upward travel. Shock absorbers, connected to roadwheel arms 1, 2, and 6, dampen bounce and return cycles of roadwheel arms when driving over uneven surfaces.



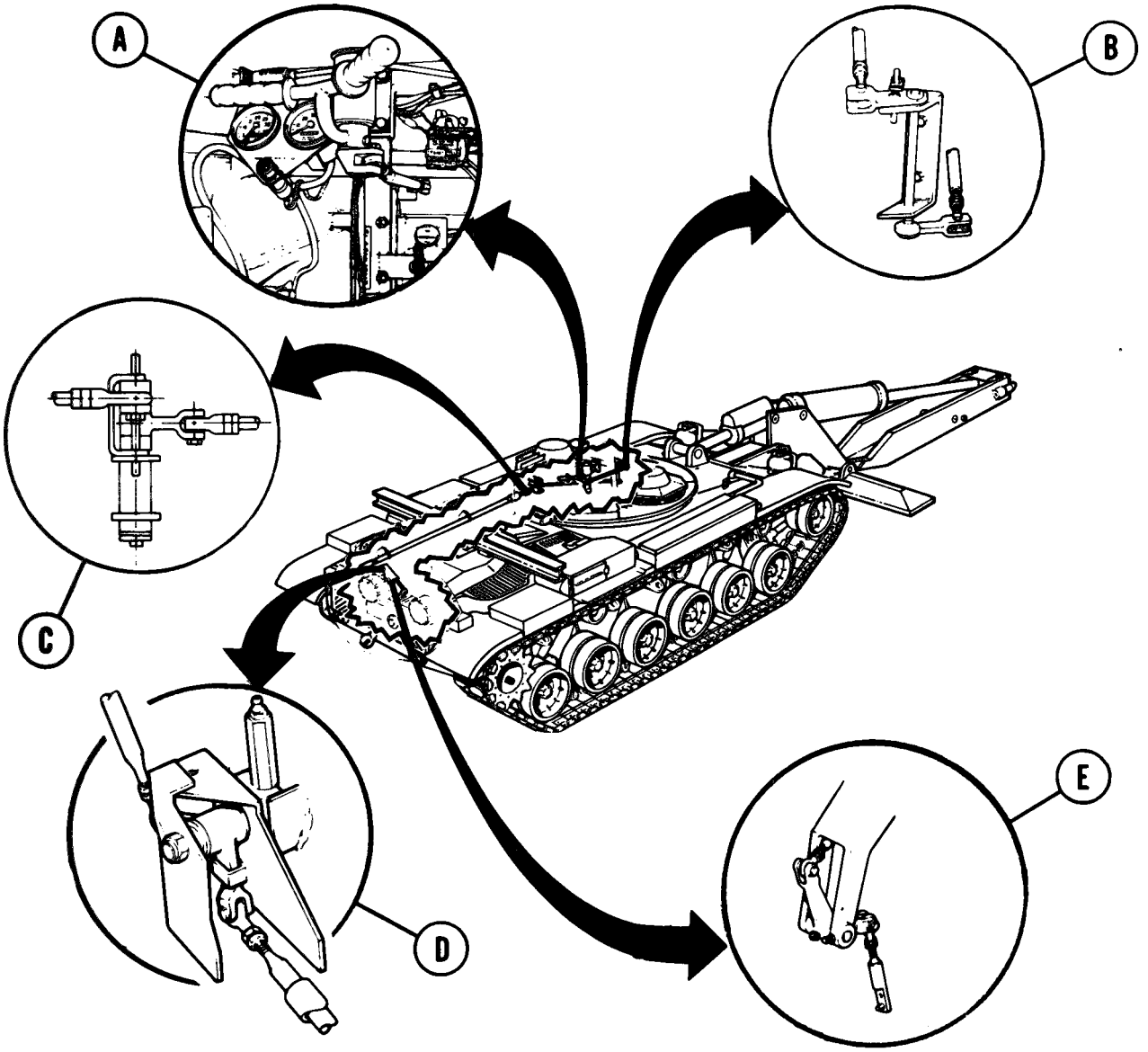
(E) TRACK DRIVE SPROCKETS AND HUB
1. SPROCKET
2. HUB

(F) VOLUTE BUMP SPRINGS AND SHOCK ABSORBERS
3. VOLUTE BUMP SPRINGS
4. SHOCK ABSORBERS

TA249796

SYSTEMS OPERATION - Continued

STEERING SYSTEM. Steering control is through a T-bar handle connected to transmission by linkage passing down left side of hull interior, connecting steering handle with steer valve shaft assembly. Transmission controls track drive through hydraulic clutches and bands. Adjusting points on steering controls are at steering rod ends, clevises and linkages located in operator's station, engine compartment, and on transmission.



(A) STEERING HANDLE AND MOUNT ASSEMBLY
(B) STEERING CONTROL LEVER ASSEMBLY
(C) STEERING CONTROL LINK ASSEMBLY
(D) STEERING CONNECTING LINK AND SHIELD ASSEMBLY
(E) ENGINE COMPARTMENT STEERING CONTROL LINK ASSEMBLY

TA249797

SYSTEMS OPERATION - Continued

HULL-EXTERIOR. This section describes towing hooks and pintle, hull access covers, fenders and stowage boxes, hull body covers and hatches, and escape hatch.

(A) TOWING HOOKS AND PINTLE. Towing cables can be attached to front- or rear-mounted hooks so vehicle can be towed or used to tow another vehicle. Towing pintle, mounted on rear of vehicle, used to attach towing bar to tow another vehicle or tank.

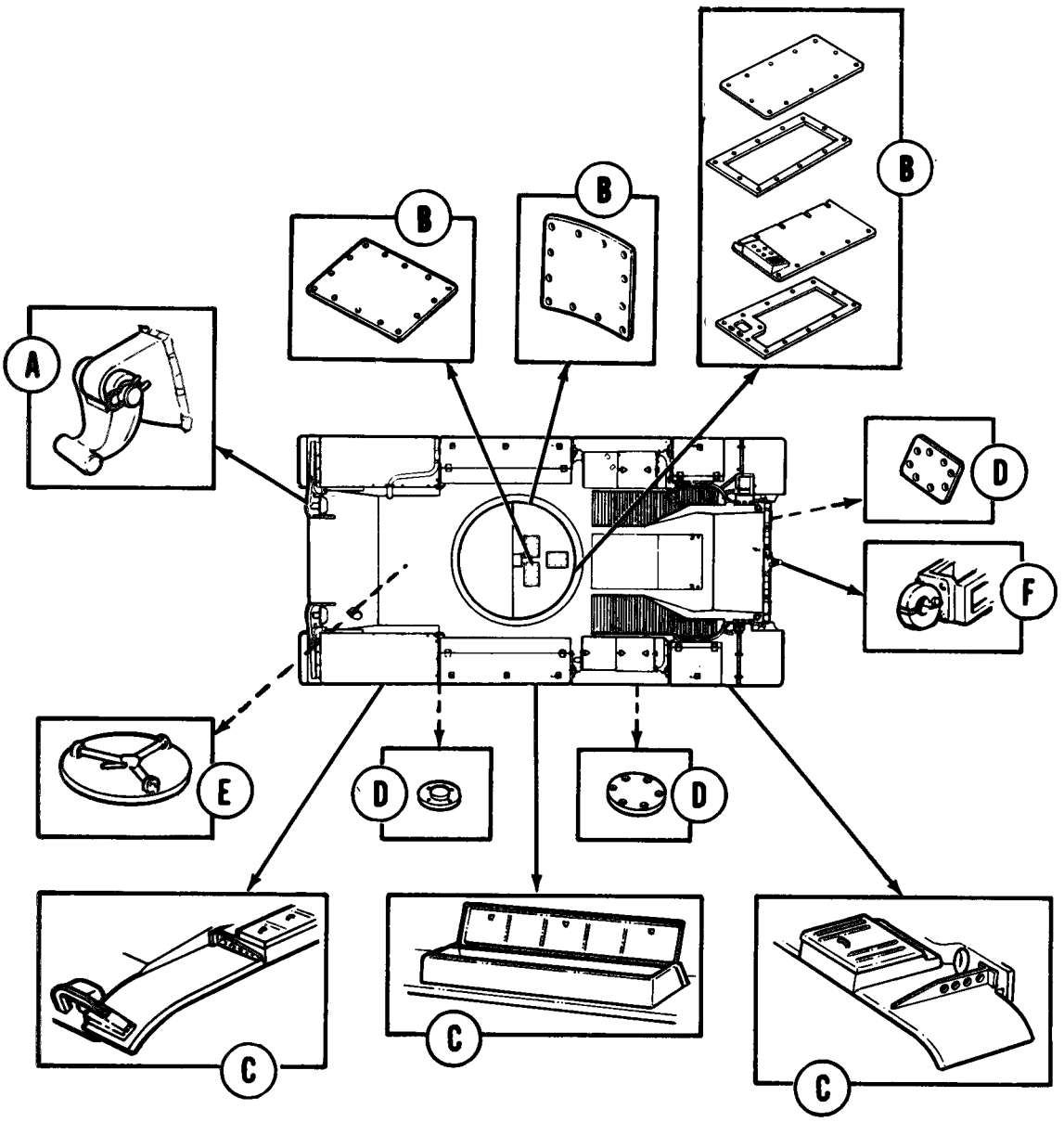
(B) HULL ACCESS COVERS. Provide access to various interior hull openings so maintenance work can be done on vehicle parts.

(C) FENDERS AND STOWAGE BOXES. Stowage boxes are mounted to fenders and provide storage space for vehicle equipment and tools.

(D) HULL BODY COVERS AND HATCHES. Covers and hatches provide openings into hull from out side for maintenance, brake and transmission adjustment, and drainage.

(E) ESCAPE HATCH. Escape hatch located on hull floor allows for exit in emergencies. A single-action dump handle and mechanism dumps the hatch.

SYSTEMS OPERATION - Continued



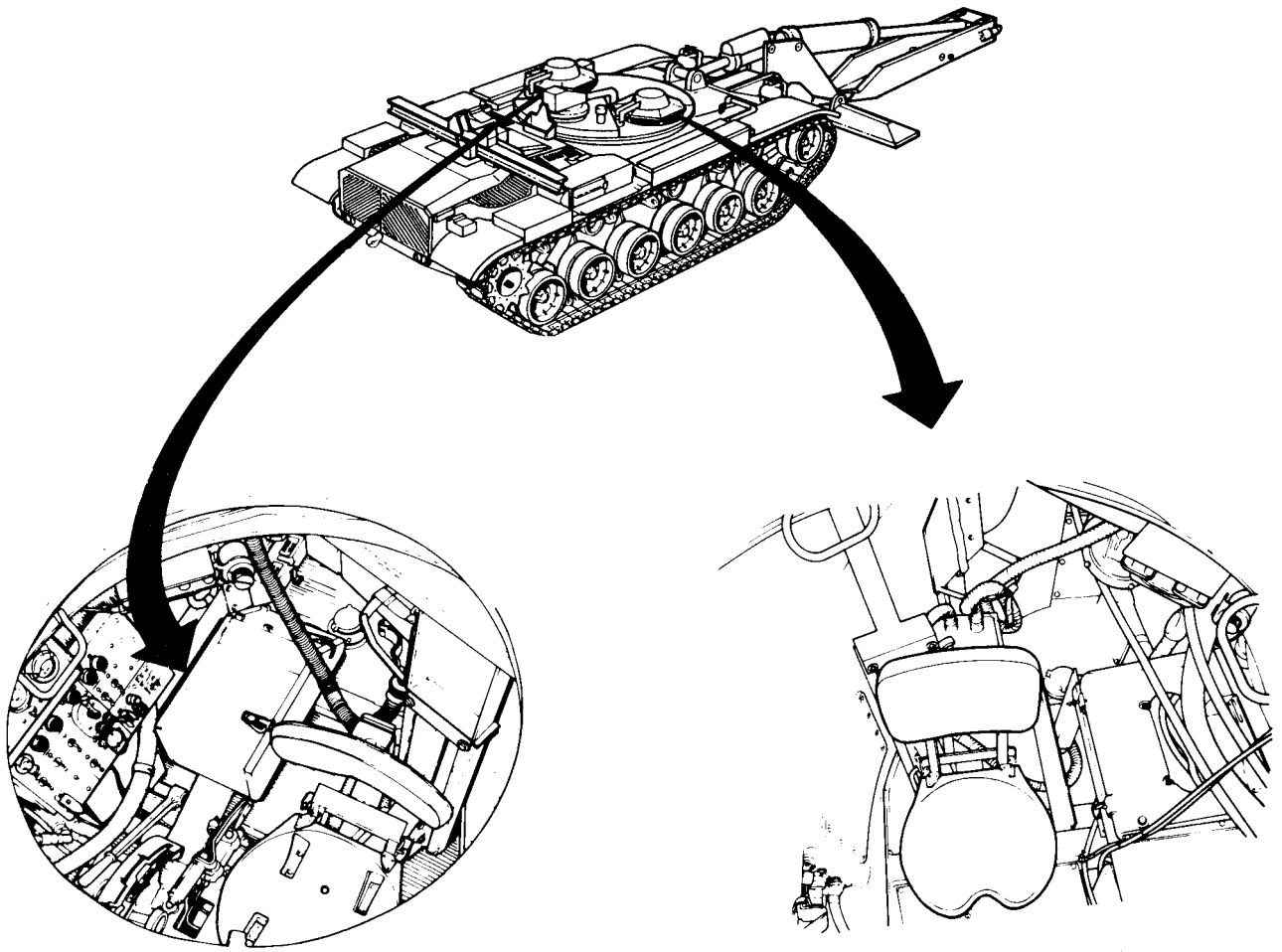
HULL EXTERIOR

(A) TOWING HOOKS
(B) HULL ACCESS COVERS
(C) FENDERS AND STOWAGE BOXES
(D) HULL BODY COVERS AND HATCHES
(E) ESCAPE HATCH
(F) TOWING PINTLE

TA249798k

SYSTEMS OPERATION - Continued

HULL-INTERIOR. Operator's and commander's seats are mounted on a support column. Seat can be adjusted forward and backward, and up and down, and seat back can be adjusted for comfort. Seat cushion and backrest are padded with foam rubber and covered with coated cloth. Backrest is easily removable. Periscope stowage boxes are mounted next to the operator's and commander's seats.



HULL INTERIOR

QUADRANTS REMOVED FOR CLARITY

TA249799

SYSTEMS OPERATION - Continued

PERSONNEL HEATER SYSTEM. Provides heater air for vehicle crew. Circulates air through vehicle in air duct system. Air flow speed is constant. Heater switch has two heater selections, low and high.

(A) PERSONNEL HEATER. Combustion type heater, burns same fuels as engine in a sealed heat exchanger. Combustion air and air to be heated supplied by two separate blowers on a single blower motor. Combustion air fan flows air into primary and secondary combustion air openings where air flows around circular channel in combustion chamber. Combustion products are exhausted to outside through flexible metal hose coupled through hull to metal exhaust tube mounted on right front fender.

(B) FUEL SYSTEM. Fuel flows from personnel heater fuel pump forward of driver's station to heater where fuel flow is regulated by solenoid-actuated fuel control valve on top of heater case. Fuel control valve is controlled by personnel heater switch on master control panel.

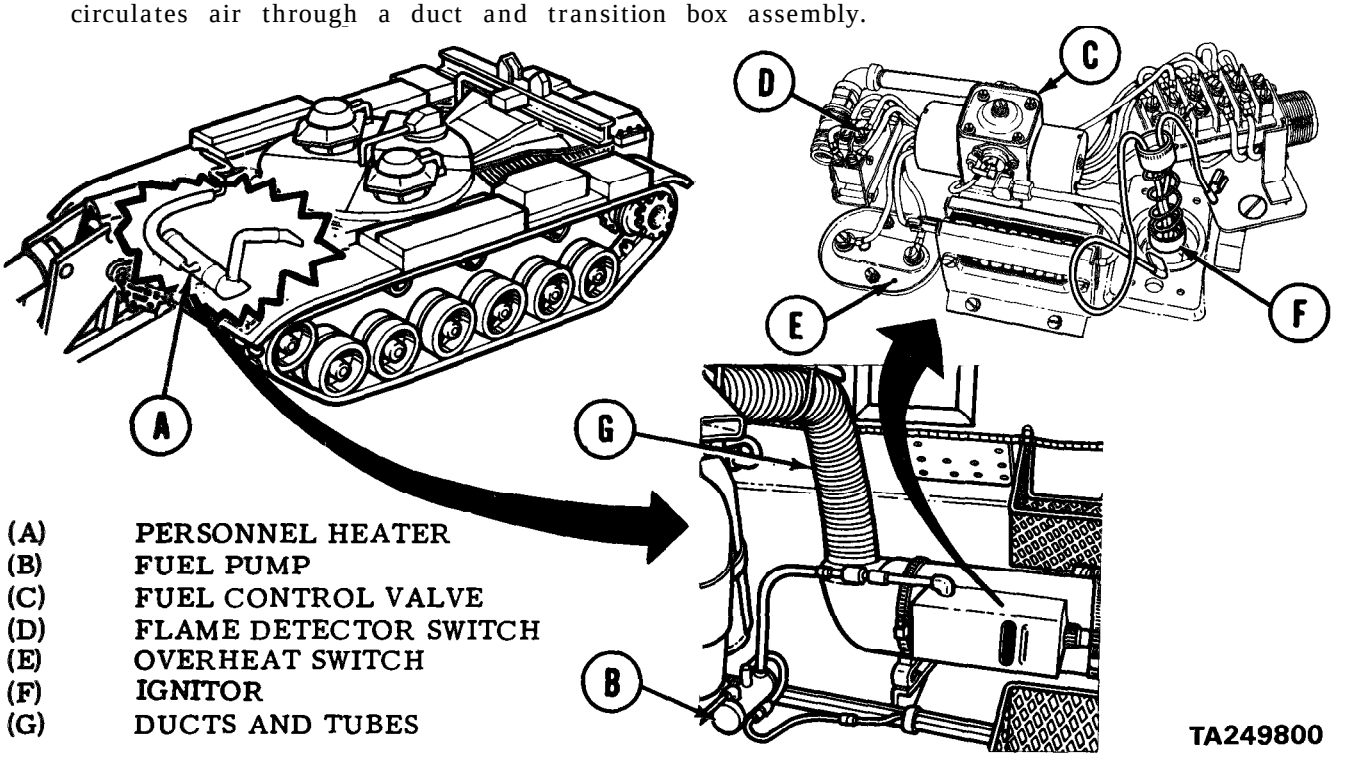
(C) IGNITION CONTROL. Fuel enters through two standpipes on heater and is ignited in combustion chamber by glow-plug-type ignitor. Electric heating element in fuel control valve preheats fuel for cold weather starts.

(D) FLAME DETECTOR SWITCH. Shuts off heater motor after flame in heater is established and permits blower to operate.

(E) OVERHEAT SWITCH. Safety switch to shut off fuel flow when heater temperature exceeds safe maximum limits.

(F) IGNITOR. A glow-plug-type ignitor, ignites fuel in combustion chamber.

(G) DUCTS AND TUBES. Ventilating air blower forces air through slots in heat exchanger and circulates air through a duct and transition box assembly.

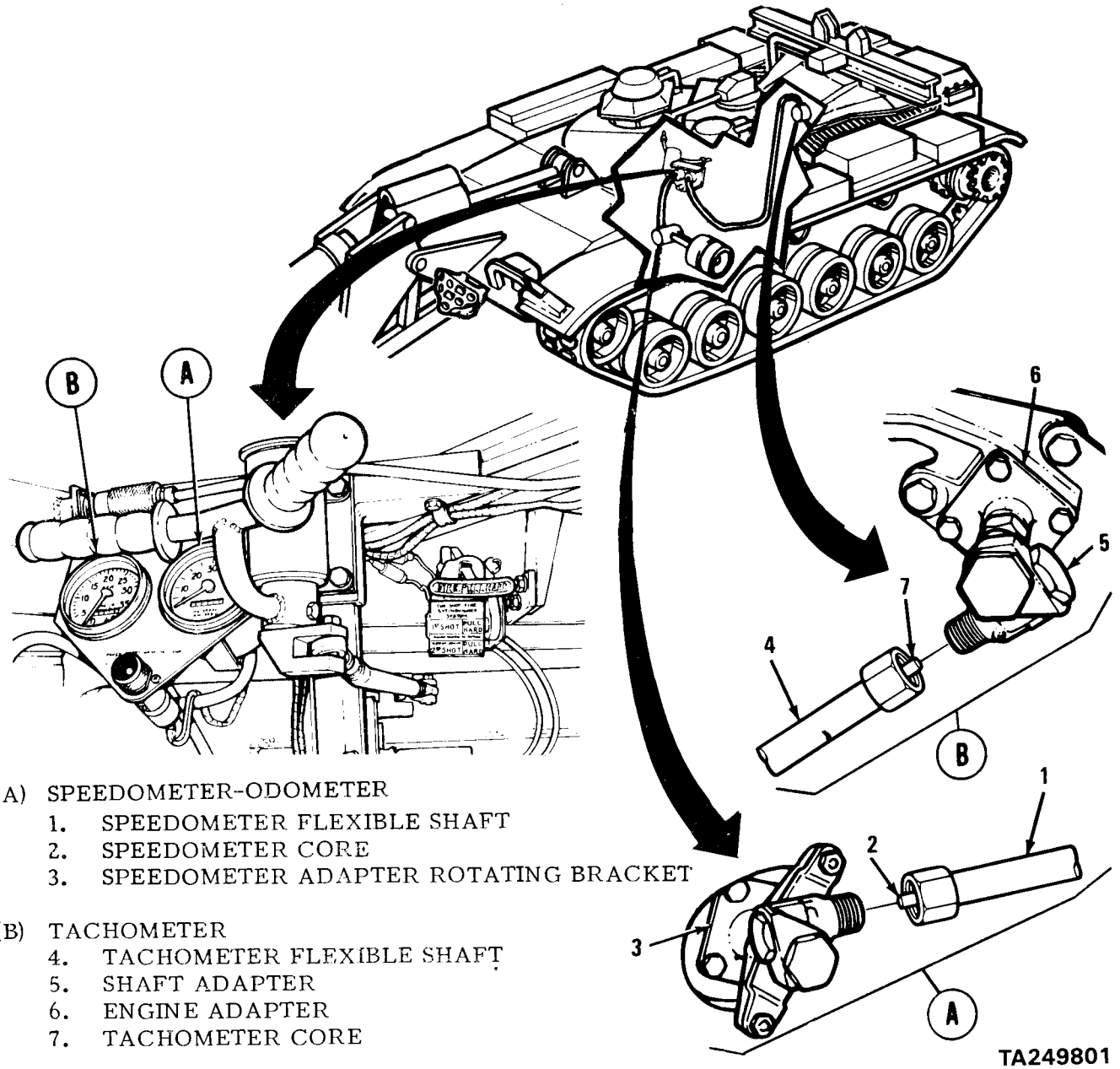


SYSTEMS OPERATION - Continued

SPEEDOMETER AND TACHOMETER. Speedometer-odometer and tachometer-hours meter mount on hull roof in front of driver. Speedometer-odometer driven by shaft in left front track support roller through right-angle drive adapter driven by shaft rotating with hubcap. Tachometer-hour meter driven through flexible shaft attached to engine adapter on accessory end of engine.

SPEEDOMETER-ODOMETER. Displays speed and mileage driven.

TACHOMETER-HOUR METER. Displays engine speed (RPM) and clock hours on engine based on operation at 2025 RPM.

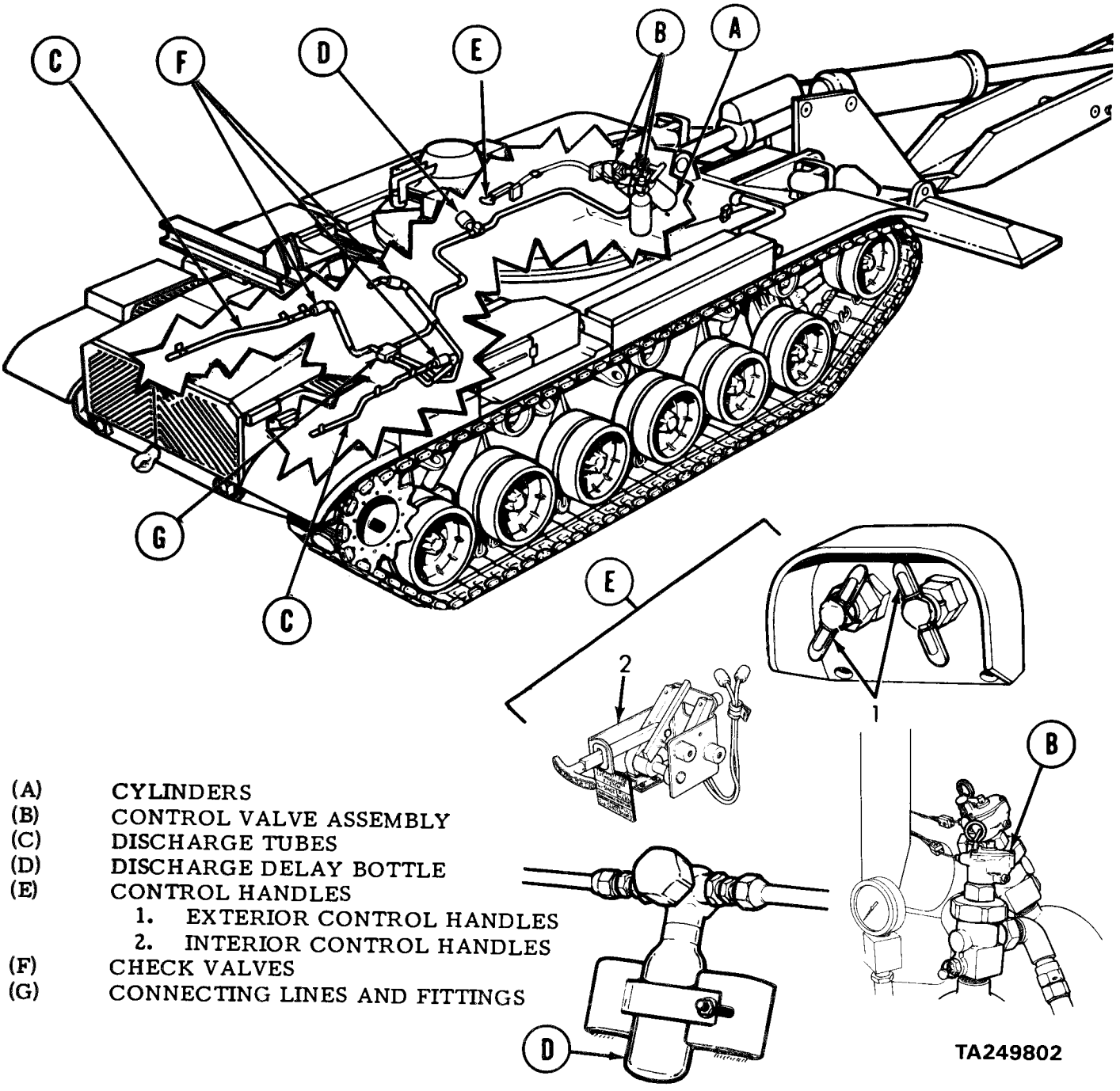


(A) SPEEDOMETER-ODOMETER
1. SPEEDOMETER FLEXIBLE SHAFT
2. SPEEDOMETER CORE
3. SPEEDOMETER ADAPTER ROTATING BRACKET

(B) TACHOMETER
4. TACHOMETER FLEXIBLE SHAFT
5. SHAFT ADAPTER
6. ENGINE ADAPTER
7. TACHOMETER CORE

SYSTEMS OPERATION - Continued

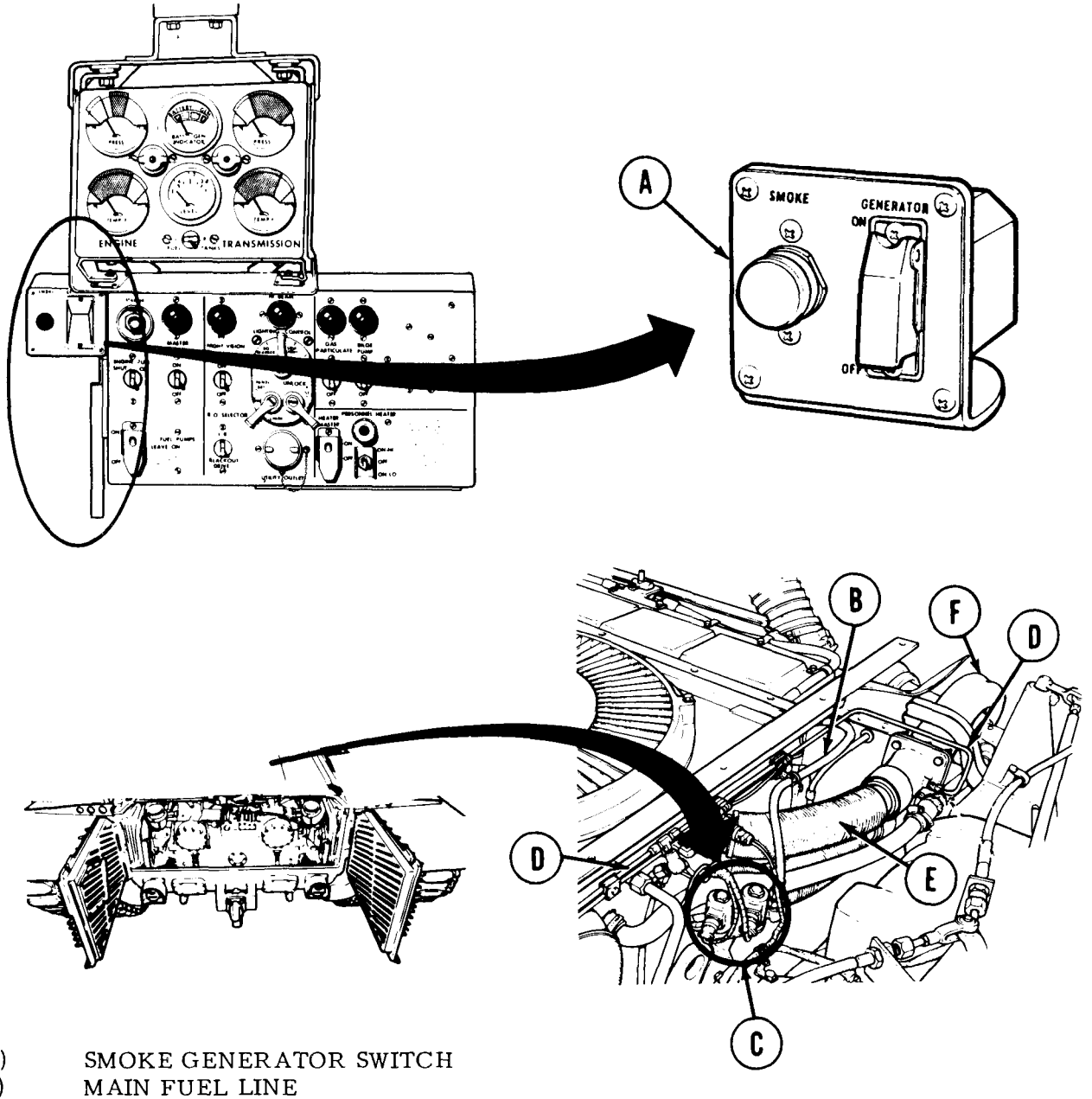
FIXED FIRE EXTINGUISHER SYSTEM. Mounted to left front of driver's seat, system is a two-shot system. First shot discharges one carbon dioxide cylinder; second shot discharges remaining two carbon dioxide cylinders. Discharge tubes permit extinguishing fires in engine compartment. Charge flows through tubes to discharge delay bottle. At predetermined time, discharge delay valve opens to allow charge to flow through check valves and out of perforated tubing on fuel tanks. Exterior control handles on left front of hull permit operation from outside vehicle. Interior handles are located to right of driver's seat at eye level.



(A) CYLINDERS
(B) CONTROL VALVE ASSEMBLY
(C) DISCHARGE TUBES
(D) DISCHARGE DELAY BOTTLE
(E) CONTROL HANDLES
  1. EXTERIOR CONTROL HANDLES
  2. INTERIOR CONTROL HANDLES
(F) CHECK VALVES
(G) CONNECTING LINES AND FITTINGS

SYSTEMS OPERATION - Continued

ENGINE SMOKE GENERATING SYSTEM. Smoke generating system provides a smoke screen capability to improve combat effectiveness. Smoke generating system is controlled by a switch on master control panel, and receives power through air cleaner blower motor relay. Fuel, regulated by two solenoid valves at rear of powerplant, is provided to system from main fuel lines into right and left bank upper exhaust pipes where fuel passes through turbosupercharger and finally exhausted through exhaust tubes as dense, white smoke.



(A) SMOKE GENERATOR SWITCH
(B) MAIN FUEL LINE
(C) FUEL SOLENOID VALVES
(D) FUEL OUTPUT TUBES
(E) EXHAUST PIPE
(F) TURBOSUPERCHARGER

TA249803

CHAPTER 3

HULL MAINTENANCE

Section I.
REPAIR PARTS, SPECIAL TOOLS, TESTING, MEASURING, DIAGNOSTIC EQUIPMENT (TMDE), AND SUPPORT EQUIPMENT

COMMON TOOLS AND EQUIPMENT

For authorized common tools and equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

Special tools for organizational maintenance are listed and illustrated in TM 5-5420-202-24P, which is the authority for requisitioning replacements.

ENGINE

Item	Use
1. Mechanical Puller (5379997)	Remove fan drive oil seal housing
2. Sleeve Spacer (10882651)	Prevent oil leakage from fan rotor hub when performing leak check (two required)
3. Open End Wrench (8761568)	Remove and install starter mounting nuts
4. Box and Open Wrench (10935476)	Remove and install generator mounting nuts
5. V-Pack Cleaner (12326132)	Clean air cleaner filter

TRANSMISSION

Item	Use
6. Socket Wrench Socket (7003946)	Loosen and tighten locknuts on reverse band adjusting screw and low range band adjusting screw
7. Deleted	

SUSPENSION

Item	Use
8. Axle Remover Adapter (12304246)	Remove track support roller axle. (used with slide hammer puller 5573615)
9. Roadwheel Adapter (7080285)	Remove roadwheel arm and track adjusting link (used with slide hammer puller 5573615)
10. Track End Connector Wear Gage (10873933)	Check wear of end connectors
11. Track Torquing Tool Kit (12326261)	Torque track components
12. Manual Control Handle (7083883)	Remove and install bearing cups (used with inserter set items 17 and 18 and remover replacer 7082863)
13. Roadwheel Arm Lifter (7010355)	Remove and install roadwheels
14. Bushing Tool Handle (12326060)	Remove and install shock absorber yoke bracket bushing (used with remover and replacer, item 30.3)
15. Final Drive Dowel Remover (8390335)	Replace track drive sprocket tapered dowels
16. Bearing Tool Assembly (12325917)	Remove and install roadwheel support arm adjusting link bearing
17. Bearing Inserter Set (7082834)	Remove and install outer bearing cups from track support roller wheel and compensating idler wheel hub (used with handle, item 12)
18. Bearing Inserter Set (7082876)	Remove and install inner bearing cups on roadwheel hub and compensating idler hub (used with handle, item 12)
19. Track Connecting Fixture (12252120)	Connect track
20. Removal and Replacer (11645917)	Remove and install track adjusting link pin (used with slide hammer puller 5573615)

SUSPENSION (Continued)

Item	Use
21. Seal Inserter (7078977)	Install inner bearing oil seal on compensating arm spindle and roadwheel arm spindle (used with remover and replacer handle 7082881)
22. Seal Inserter (7078973)	Install outer bearing oil seal on roadwheel arm support spindle (used with remover and replacer handle (7082881)
23. Seal Inserter (7082882)	Install inner bearing oil seal on track support roller wheel
24. Seal Inserter (8708188)	Install oil seal and retainer assembly on compensating idler arm
25. Wire Rope Assembly (8366458)	Remove and install final drive hub and sprocket assembly
26. Shock Absorber Bearing Replacer (11654533)	Remove shock absorber bearing
27. Spanner Wrench (12284929)	Remove and install roadwheel and compensating idler arm support spindle retaining nut
28. Socket Wrench Adapter (7078976)	Remove roadwheel arm torsion. bar end plug
29. Face Wrench Socket (12257561)	Remove and install bearing adjusting nut on roadwheel track support roller and compensating idler wheel
30. Sprocket Tooth Gage (8708388)	Check wear of final drive sprockets
30.1 Dial Pressure Gage (12310644)	Check grease actuated track adjusting link pressure
30.2 Bearing Driver (12290993)	Remove and install track adjusting link bearing
30.3 Remover and Replacer (12326059)	Remove and install shock absorber yoke bracket bushing (used with handle, item 14)

POWERPLANT

Item		Use
31	Ground Hop Kit (Powerplant Tests) (12304135)	Used to ground hop powerplant outside of tank
31.1	Tachometer Assembly (Fabricated, Figure 2, Appendix F)	Measure RPM during tests
32	Engine and Transmission Sling (12257229)	Remove and install powerplant and top deck grille doors
33	Oil Cooler Cleaning Tool (11641959)	Clean oil coolers with cleaning solution
34	Resilient Mount Remover (10933782)	Remove resilient mounts from transmission mounting bracket

MISCELLANEOUS

Item		Use
35	Torque Wrench Adapter (11663358-2)	Removal/Installation engine guide mount
36	Deleted	
37	Track End Connector Puller and Pump (11669394-1)	Remove track end connectors
37.1	Center Punch (Fabricated, Figure 9, Appendix F)	Stake pin in final drive quick-disconnect clamp
38	"T" Harness (11674369)	Used to troubleshoot 650 amp alternator/regulator

All data on page 3-5 deleted.

Section II. SERVICE UPON RECEIPT

GENERAL

This section contains information on services to be performed upon receipt of the vehicle from the issuing organization. Where practicable, the crew will assist in the described services. For services to be performed on the launcher components, refer to TM 5-5420-228-24.

INSPECTION AND SERVICING

a. Inspect vehicle for damage.

b. Check inventory components (with assistance of issuing organization) against packing list.

c. Check packing list against Basic Issue Items List (TM 5-5420-202-10) to ensure that all indicated items have been received.

d. Record all missing items.

INSTALLATION AND SETUP

a. Make sure that grade of engine oil installed, as indicated on processing tag (DD Form 1397), is of the grade specified by LO 5-5420-202-12 for temperatures in your area.

b. Check oil level in engine and transmission. Service as required (LO 5-5420-202-12).

c. Start engine (TM 5-5420-202-10). Check for fuel and oil leaks. If leaks are observed, shut engine down and correct.

d. Perform Preventive Maintenance Check and Services, Sub Section I, weekly (TM 5-5420-202-10).

CORROSION INSPECTION

a. During normal semiannual inspection, check all parts and surrounding areas for corrosion. Corrosion damage is divided into the following stages.

Stage 1. Red, black, and white corrosion deposits on surface, etching, and pitting. Base metal is sound.

Stage 2. Powdered, granular, or scaled condition. Base metal is sound.

Stage 3. Surface condition and corrosion deposits are similar to Stage 2, except that metal in the corroded area is unsound and small pin holes may be present.

Stage 4. No metal remains at point of severest corrosion. Corrosion holes in the area or metal is completely missing.

b. Corrosion areas in Stages 1 and 2 shall be cleaned, primed, and painted with required final top coat in accordance with DA PAM 738-750. In the areas where Stages 3 and 4 corrosion conditions exist, the corrosion must be completely removed, repairs made, or parts/assemblies replaced with serviceable parts/assemblies where repair is not economical.

SECTION III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS), LUBRICATION INSTRUCTIONS, AND MANDATORY REPLACEMENT PARTS

INTRODUCTION

a. General.

Preventive maintenance is the systematic care, inspection, and service of the M60A1 AVLB to keep it in serviceable condition and to detect faults and failures before extensive and time consuming repairs or replacement are required. Maintenance checks are services performed by organizational maintenance and are described below.

This section contains the procedures and instructions to perform M60A1 AVLB hull organizational preventive maintenance checks and services. These services are performed by organizational maintenance personnel assisted by the vehicle crew. Ensure that all crew level hull PMCS procedures have been completed prior to performing organizational semiannual PMCS. Refer to DA PAM 738-750 for instructions on the use of forms pertaining to PMCS.

Organizational services are defined by, and restricted to, the procedures outlined in this section and Appendix B, Maintenance Allocation Chart, unless approval to perform higher category services has been given by the support maintenance unit. For additional inspection and classification information on track components, see TM 9-2530-200-24.

Knowledge of operating and maintenance procedures outlined in TM 5-5420-202-10 are essential to the performance of organizational PMCS. Organizational mechanics must be familiar with these procedures so that they can apply them in the performance of their duties.

The driver of the vehicle is often unaware of gradually developing defects. Therefore, the vehicle must be road tested by organizational maintenance personnel during semiannual maintenance checks and services. Any repairs or adjustments necessary to ensure safe operation should be made prior to road test. All faults and corrective actions will be noted on DA Form 2404, column “a”. The item number recorded in this column must correspond to the PMCS item. After deficiencies have been corrected and the tactical situation permits, an additional road test must be made for a distance of not less than three nor more than five miles.

The preventive maintenance checks and services listed in this section are to be performed at intervals determined by calendar days or vehicle operating hours, whichever comes first: (a) bimonthly or after 25 operating hours, (b) semiannually or after 150 operating hours, (c) annually or after 300 operating hours.

Hard (fixed) time intervals and the related man-hour times are based on normal operation. The man-hour time specified is the time you need to do all the services prescribed for a particular interval. Change the interval if your lubricants are contaminated or if you are operating the equipment under adverse conditions, including longer-than-usual operating hours. The interval may be extended during periods of low activity. If extended, adequate preservation precautions must be taken.

PMCS items and intervals have been determined by using Reliability Centered Maintenance (RCM) logic.

If anything looks wrong and cannot be fixed, report it on DA Form 2404. If something looks dangerous or may cause equipment damage, report it immediately to your maintenance supervisor.

INTRODUCTION - Continued

b. PMCS Procedure. PMCS column explanations are as follows:

Column 1- Item No. The first column contains the item number which shall be used as a source of item numbers for the TM Number Column on DA Form 2404, Equipment Inspection and Maintenance Worksheet, in recording results of PMCS.

Column 2- Interval. The second column lists the interval at which the items are to be inspected.

Column 3- Location - Item to Check/Service. The third column lists the item to be checked or serviced.

Column 4- Procedures. The fourth column contains all the information required to accomplish the checks and services.

Column 5- Not Fully Mission Capable if. The fifth column contains all the conditions which make the vehicle not fully mission capable.

c. Special Information.

(1) Precautions. The following precautions will help prevent personal injury or damage to equipment.

Do not spill solvent, fuel, or lubricant on rubber parts. Solvent, fuel, and lubricants may damage rubber parts.

Do not use turbine fuel, diesel fuel, gasoline, paint thinner, or benzene (benzol) for cleaning. These liquids may cause personal injury.

Do not clean inside hull with high pressure steam, water, or air. Some parts inside hull may rust or be damaged.

Do not use polishing cloths, liquids, pastes, or other rough cleaners to clean instrument lenses or mirrors. Use lens tissue paper to clean lenses and mirrors. Remove fingerprints, oil, and dirt with lens cleaning compound and lens tissue paper.

(2) Services. Services performed by the organizational maintenance mechanic consist of the following tasks:

Adjusting. Making all necessary adjustments and alinements.

Servicing. Draining and refilling units with oil and changing or cleaning oil falters, fuel falters, and air cleaners.

Tightening. Tightening nuts, bolts, screws, and other types of fasteners with a torque wrench to the value listed in the maintenance manual. Do not overtighten; this may strip threads and break off the part being tightened.

Repairing. Repairing includes inspection, cleaning, preserving, adjusting, replacing, welding, strengthening, and other tasks associated with putting parts in working condition.

INTRODUCTION - Continued

(3) General Cleaning Instructions.

If a steam cleaner is available, it may be used to remove any remaining dirt. After water or steam cleaning, lubricate vehicle. Check all lubricant reservoirs for water droplets. If water is found, drain and refill. Clean grease, oil, or dirt from all metal parts with dry cleaning solvent, cleaning compound, or equivalent.

Use mild soap and water to clean or wash parts not made of metal. Rinse thoroughly after cleaning with water and then dry.

Remove rust or dirt from fine-machined surfaces with dry cleaning solvent and crocus cloth, if necessary. Do not use any other material. Be careful not to change the dimension of parts when rubbing off rust. Coat bare metal surfaces, after cleaning, with lubricating oil.

Nameplates, caution plates, and instruction plates may rust quickly. When they are rusty, clean parts and coat them with lubricating oil.

(4) General Maintenance Instructions

Put protective cape or plugs on all tubes, hoses, and fittings as coon as you disconnect them. Dirt could get in and ruin the system. Do not remove cape or plugs until you are ready to connect the system.

Replace bent, broken, or stripped bolts, nuts, screws, and washers. Bolts, screws, and nuts may be loose if rust, chipped paint, or bare metal is around them. Tighten loose screws, bolts, and nuts. Replace missing parts.

Inspect electric wires for broken, chafed, cracked, discolored, frayed, loose, melted, or worn insulation. Replace or repair bad parts.

Have another soldier help aline mating ends of connectors, plugs, and receptacle on larger harnesses. Make sure that pine and keyways line up. Tighten twist-snap type connector, plugs, or receptacles until a click is heard. Tighten screw-on type connector until a ratchet noise is heard to indicate that connectors, plugs, or receptacle are tight.

Look at hoses, fluid lines, and tubes for bends, wear, cracks, or leaks. Replace bad parts. Make sure all clamps and fittings are tight. If a fitting leaks, tighten it.

Hold fitting adapter with one wrench and tighten nut with another wrench. When tightening fittings, tighten nut snug and then tighten 1/6-turn to 1/8-turn more. If fitting leaks, loosen nut a full turn and then tighten. If still leaking, replace defective parts.

Service, clean, or change oil filters, as applicable, when they are known to be contaminated or clogged; service is recommended by AOAP laboratory analysis; or at prescribed hardtime intervals.

(5) Lubrication.

Use only authorized lubricants.

All lubrication instruction are mandatory.

INTRODUCTION - Continued

When checking fluid levels, vehicle must be on level surface.

Oil filters shall be serviced/cleaned/changed when they are known to be contaminated or clogged, service is recommended by AOAP, or hard time service is required.

Dispose of used lubricant in accordance with local Standing Operating Procedures (SOP).

For arctic operation, see FM 9-207.

For desert operation, see FM 90-3.

Clean all grease fittings before attaching grease gun.

When using grease gun, operate until grease appears around seals or out of relief valve and check escaping grease for contamination. If contamination is found, notify support maintenance.

If no other treatment is directed, paint or clean and coat unprotected metal surfaces with cleaner, lubricant, preservative (CLP).

Clean around filler necks/drain plugs/openings before servicing to keep dirt from entering system.

Lubricate oil can points as they become accessible while performing PMCS procedures. Use the applicable lubricant identified and lubricate the following items as a part of PMCS:

- Headlight removal nuts
- Fender stowage box latches and hinges
- Towing hooks (hinge pin)
- Brake linkage
- Transmission support guide rails and rollers
- Driver's escape hatch late model (clean and coat pins, plungers, and all unpainted surfaces)
- Grille door hinges
- Control rod clevises
- Ammunition box latches
- Driver's and commander's seats moving parts
- Hatch locks and hinges
- Universal joints
- Driver's night viewer hatch door pivot pin and latch

Oil Can Points Lubricants

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Oil Can Points + 5°F to + 125°F (-15°C to 52°C)	OE/HDO-15/40 (0-1236) MIL-L-2104	AR	AWS	0.4
+ 5°F to -70°F (-15°C to -57°C)	OEA (0-183) MIL-L-46167			

For arctic operation, see FM 9-207

Do not lubricate the following items:

- Starter solenoid
- Air cleaner blower motor
- Hydraulic powerpack electric motor
- Heater motor
- Gas particulate fan motor
- Tracks
- Tachometer drive adapter
- Ventilator blower motor
- Any item not pointed out.

INTRODUCTION - Continued

(6) Leakage Definitions.

Fluid leaks affect vehicle status. Learn the following classes of fluid leaks for unit PMCS

Class I	Seepage of fluid (as indicated by wetness or discoloration) not great enough to form drops.
Class II	Leakage of fluid great enough to form drops but not enough to cause drops to drip from item being checked.
Class III	Leakage of fluid great enough to form drops that fall from the item being checked.

All Class III leaks and any class fuel leak in the engine compartment or in the personnel heater system must be repaired before operating the vehicle. Vehicle may be operated with Class I or Class II leaks.

(7) Corrosion. Check for corrosion on entire vehicle. Become familiar with the four stages of corrosion listed below and take the appropriate maintenance action required outlined below.

Stage 1-	Red, black, or white corrosion deposits on surface with etching or pitting. However, base metal is sound.
Stage 2-	Powdered granular or scaled condition. Base metal is sound.
Stage 3-	Surface condition is similar to stage 2 except that metal in the corroded area is unsound and pin holes may be present.
Stage 4-	No metal remaining at point of severest corrosion. Corrosion holes in the area or metal completely worn away.

Stages 1 & 2- Areas are to be cleaned, primed, and painted IAW TB 43-0213.

Stages 3 & 4- Try to repair metal. If not economical or reparable, replace with new parts.

INITIAL SETUP

Preventive maintenance includes complete inspection to make sure adjustment, securing, and assembly of all parts of the vehicle are right. All cleaning, replacement, lubrication, and protection of parts or assemblies must be done as stated for trouble-free operation until the next preventive maintenance is performed.

Maintenance Forms and Records. Refer to DA PAM 738-750.

Publications. Be sure all needed publications are on hand before starting task.

Special Tools. Be sure all special tools are on hand.

Supplies. Be sure all parts and supplies are on hand.

Tools. Be sure all common tools are on hand.

Modification Work Order (MWO) Application. Check the list of current MWOs in DA PAM 25-30. Do not make any vehicle modifications except as ordered by official Army directive.

Preventive Maintenance Checks and Services for M60A1 AVLB Hull

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
	Bimonthly	Engine and Transmission	Perform powerplant oil sampling IAW DA PAM 738-750. ARMY OIL ANALYSIS PROGRAM (AOAP). Oil samples from both engine and transmission must be submitted to an assigned AOAP laboratory every 25 hours of operation or 60 days, whichever occurs first, in accordance with DA PAM 738-750. Oil will be analyzed for condition and will be changed only when directed by the AOAP laboratory. In the event AOAP laboratory support is not available, drain oil every 1500 miles or semiannually, whichever occurs first. Semiannual oil changes are to be coordinated with seasonal changes. When using OEA oil, drain every 750 miles or quarterly, whichever occurs first.	AOAP recommends oil change.
	On Condition	Engine	Replace engine oil falters (page 6-76) and drain and fill engine crankcase (page 6-12).	
			Run engine and check for oil leaks at filters and drain plugs TM 5-5420-202-10).	Any class III leak.

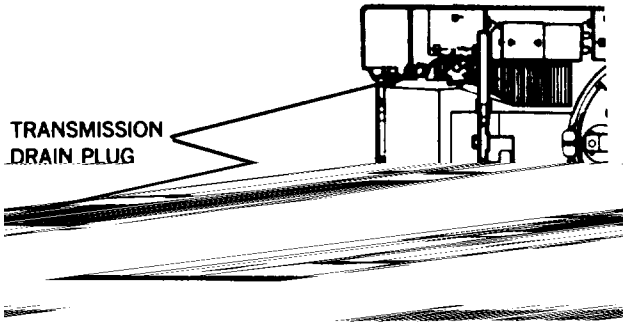
Enifne Lubricants

Temperature Range	Lubricant Mil. Symbol (NATO Code)) Specification	Capacity	Interval	Man-hour
Engine 0° to +125°F (-18°C to 52°C)	OE/HDO-15/40 (0-1236) MIL-L-2104	17 gal	OC	0.5
5°F to -70°F (-15°C to -57°C)	OEA (0-183) MIL-L-46167			

For arctic operation, see FM 9-207

Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
3	On Condition	Transmission	Drain and fill transmission: Remove two drain plug access plates from bottom of hull (page 16-39). Position 20-gallon container under drain plugs. Remove drain plugs and allow to drain into container. Clean transmission oil filter (page 11-89). Clean side oil screen (page 11-96). Clean and install drain plugs and access plates. Refill transmission to "ADD" mark on dipstick. Check oil level (TM 5-5420-202-10) Run engine and check for oil leaks at filters and drain plugs (TM 5-5420-202-10).	Any class III leak.



Temperature Range	Lubricant Mil. Symbol (NATO Code] Specification	Capacity	Interval	Man-hour
Transmission 0°F to t 125°F (-18°C to 52°C)	OE/HDO-15/40 (0-1236) MIL-L-2104	17 gal	OC	0.5
5°F to - 70°F (-15°C to -57°C)	OEA (0-183) MIL-L-46167			

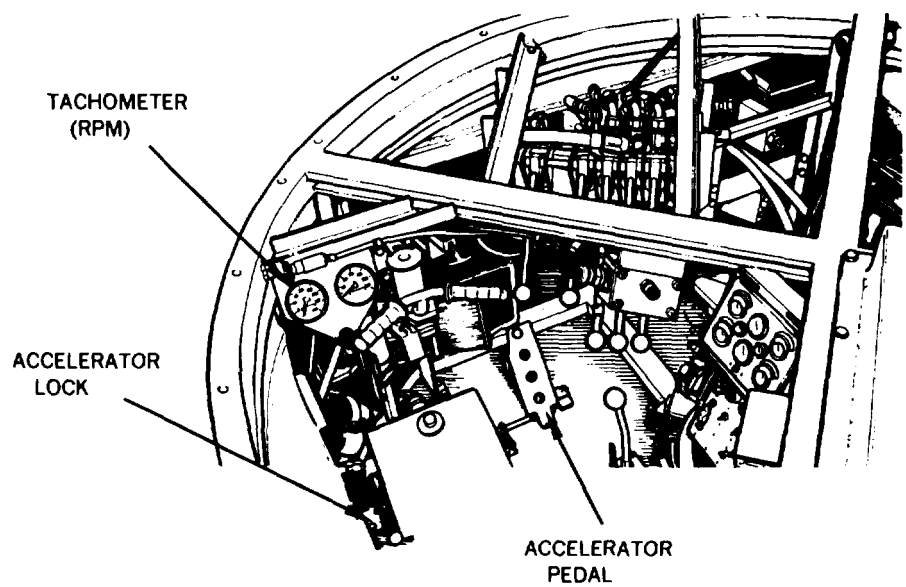
For arctic operation, see FM 9-207

Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:.
4	Semiannual	Powerplant	Ensure all before operation checks listed in TM 5-5420-202-10, Preventive Maintenance Checks and Services (PMCS), are performed. If STE/ICE is available, perform the following electrical component checks. Perform BATTERY CONDITION TEST No. 77/79 (page 4-60). Perform CHARGING CIRCUIT AND BATTERY VOLTAGE TEST No. 67 (page 4-67). Perform STARTER CURRENT FIRST PEAK TEST No. 72 (page 4-70). Perform CI (COMPRESSION IGNITION) POWER TEST No. 13 (page 4-76).	
			INITIAL ROAD TEST	
5	Semiannual	Starter	While starting engine, listen for unusual noises and difficult cranking at starter.	Any unusual noise or improper cranking.
			CAUTION Driver must remain in driver's station at all times while engine is running.	
6	Semiannual	Engine Idle	Start engine and operate at 1000 to 1200 rpm until normal operating temperature is reached.	Any unusual noise or improper cranking.

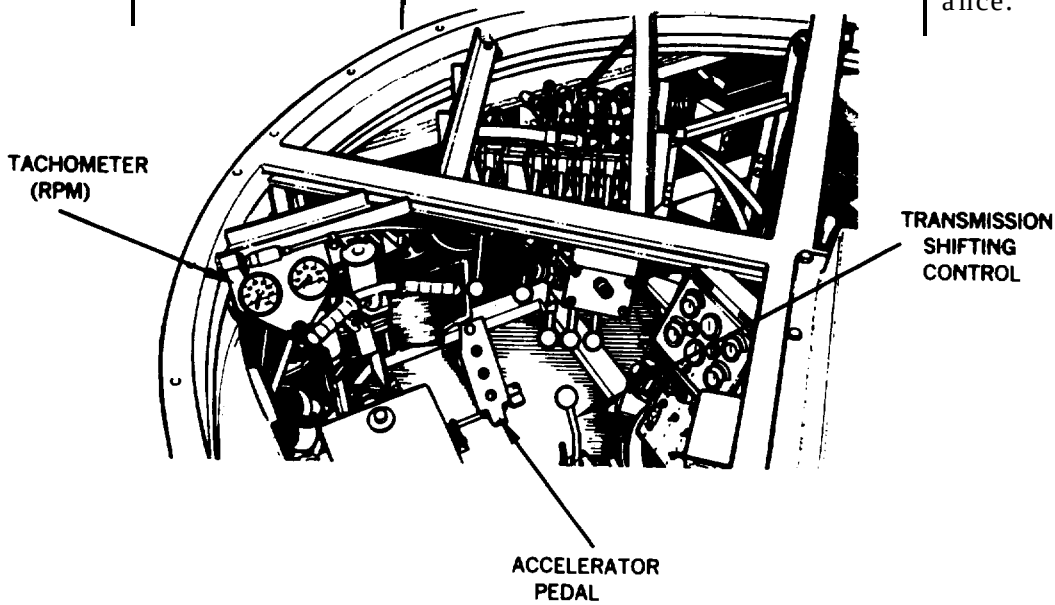
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
6	Semiannual	Engine Idle - Continued	Reduce engine speed to an idle.	
			Check that idle speed returns to 700-750 rpm.	
			If engine speed does not return to 700-750 rpm, adjust accelerator linkage (page 7-300).	Engine speed is nonadjustable.
7	Semiannual	Accelerator Lock (Engine Running)	Engage accelerator lock with engine running.	
			Check that engine rpm remains the same when foot is removed from accelerator pedal. Adjust accelerator linkage, if required (page 7-300).	Accelerator linkage cannot be adjusted.



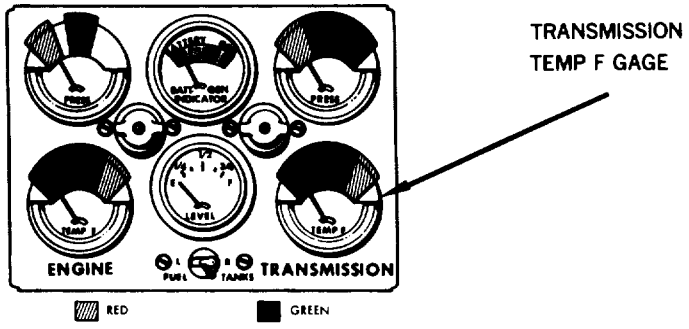
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
8	Semiannual	Engine (Governed No-Load Test)		
			CAUTION DO NOT RUN engine faster than 2640 rpm for more than 2 or 3 seconds in the event of governor malfunction.	
			With transmission shift lever in "P" (Park) and brakes applied, gradually open throttle until accelerator pedal is fully depressed.	
			NOTE In most cases, engine speed will surge over 2800 rpm and then stabilize within 30 seconds between 2550-2640 rpm.	
			Check that governor does not cut in and out.	Governor keeps cutting in and out (adjustments are required). Notify support maintenance.
			Check that tachometer rpm stabilizes between 2550 and 2640 rpm.	Tachometer does not stabilize. Notify support maintenance.



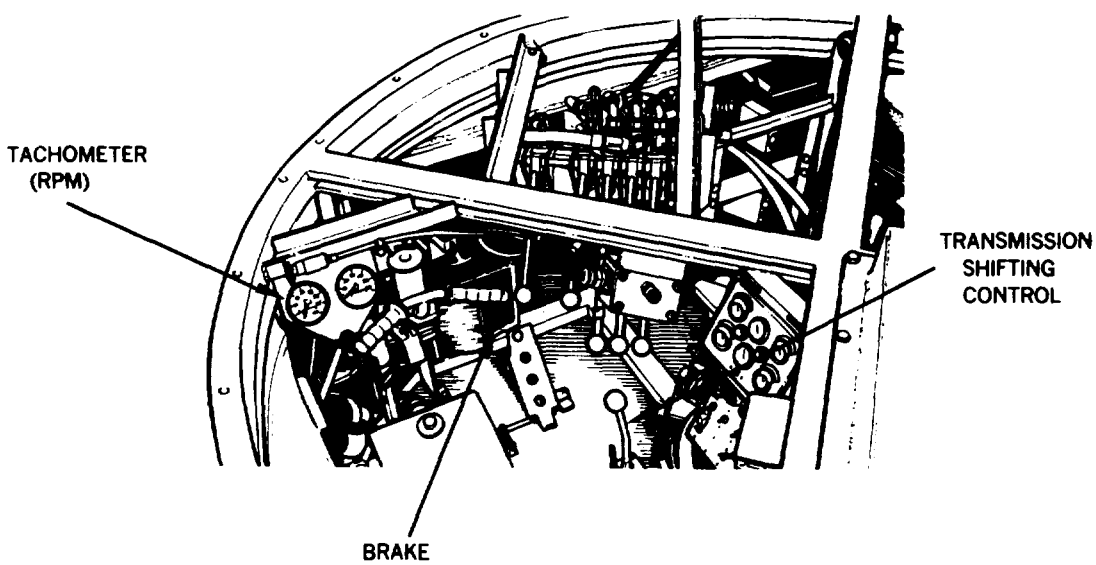
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
9	Semiannual	Engine (Stall Test)	Perform governed no-load test before attempting stall test.	
			WARNING Take all necessary safety precautions to eliminate possible injury to personnel or damage to equipment. Make sure areas in front and rear of vehicle are clear of personnel and equipment.	
			CAUTION Do not stall test for more than 30 seconds at full throttle or allow transmission oil temperature to go over 300° F (149° C), red area, on TRANSMISSION TEMP F gage.	
			With engine at normal operating temperature, apply brakes and place transmission shift lever in high range. Run engine at full throttle for no more than 30 seconds.	
			Check that engine speed stabilizes between 1800-2050 rpm.	Engine speed is below 1800 rpm after three stall checks.



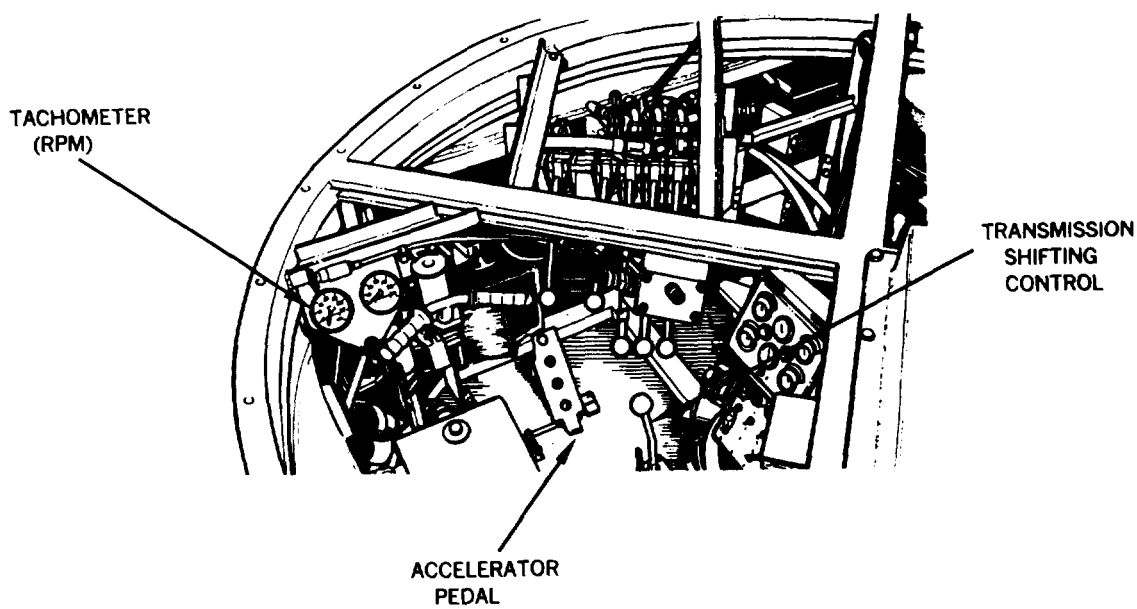
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
10	Semiannual	Transmission (Slippage Check)	Check shifting control linkage adjustment, adjust as required (page 11-52). If slippage still exists, notify support maintenance. Apply brakes. Shift transmission into low and then into reverse range. Run engine at full throttle until engine rpm stabilizes 1800-2050 (not more than 30 seconds). If engine speed is more than 2050 rpm, there is slippage in transmission servobands. Adjust bands (page 11-83) and retest. If slippage still exists, notify support maintenance. Release brakes.	Engine speed is more than 2050 rpm.



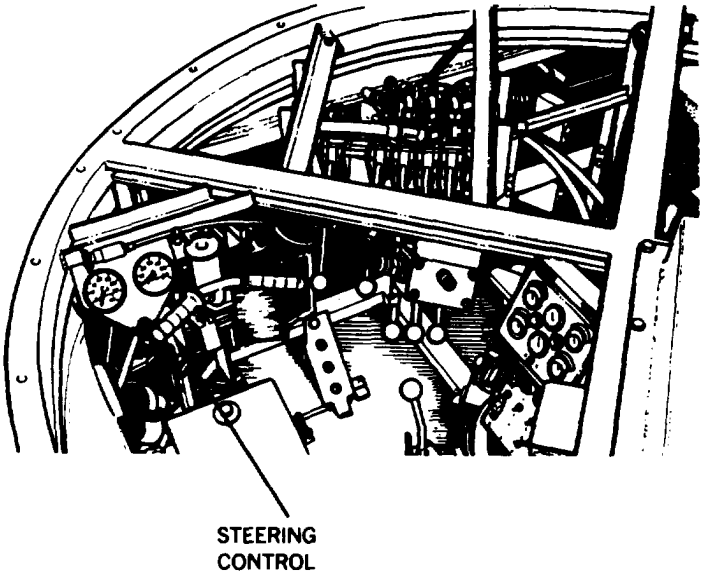
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
			DURING ROAD TEST	
11	Semiannual	Engine (Governed Speed and Performance)	Test engine for normal acceleration and full power in each transmission range while vehicle is moving.	High engine speed or low power.
			While testing in low speed range, accelerate to wide open throttle.	
			Check that engine speed under load does not exceed more than 2450 rpm. If engine speed exceeds 2450 rpm, notify support maintenance.	Engine speed exceeds 2450 rpm.



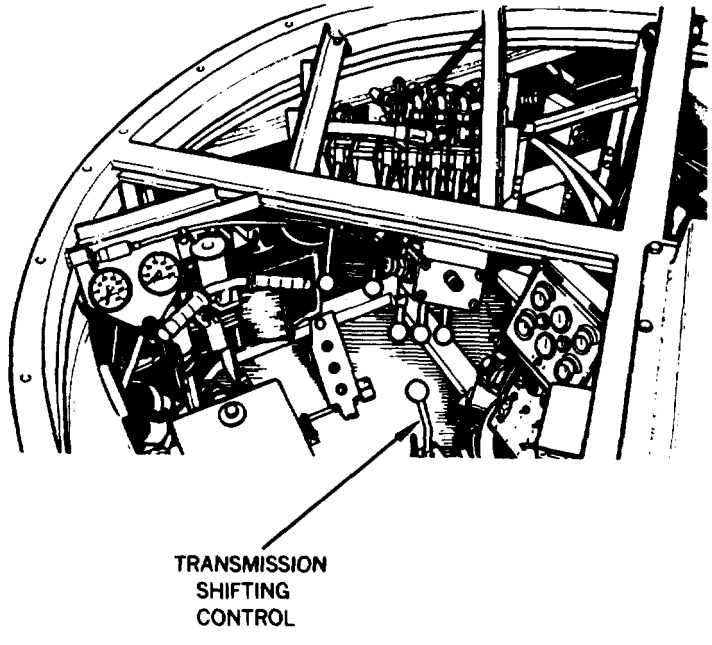
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
12	Semiannual	Steering Control	NOTE If possible, the last mile of road test should be rough terrain to check shock absorbers after road test.	
			Move steering control through full range and check for sticking or binding and that vehicle turns in direction selected. Check that steering control returns to center position when released after turning vehicle right and left. With steering control centered, check that vehicle does not wander or pull to one side at low, medium, or high speeds. Adjust steering control linkage, if required (page 15-31).	Binding, grabbing, unusual noise, vibration or failure to turn.



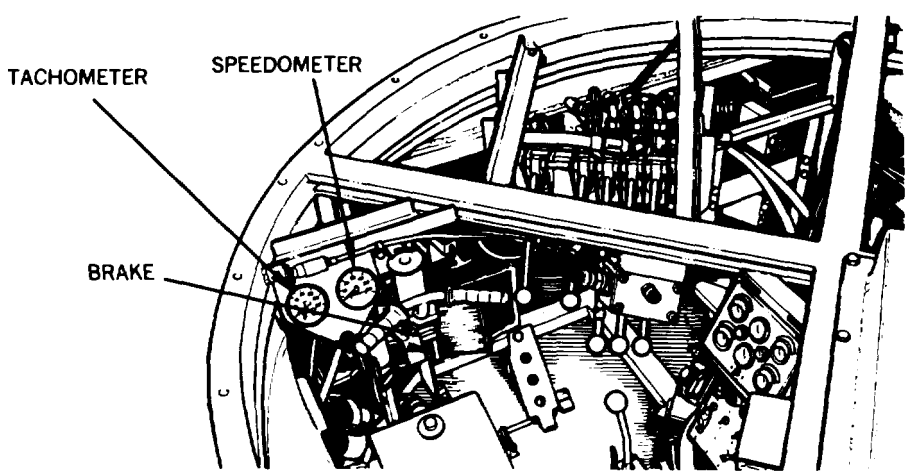
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
13	Semiannual	Shifting Control	Move shifting control through all positions.	
			Check that shifting control does not bind or stick.	Shifting control binds or sticks.
			Check for satisfactory shifting.	
			Adjust shifting linkage, if required (page 11-52).	Shifting linkage cannot be adjusted.



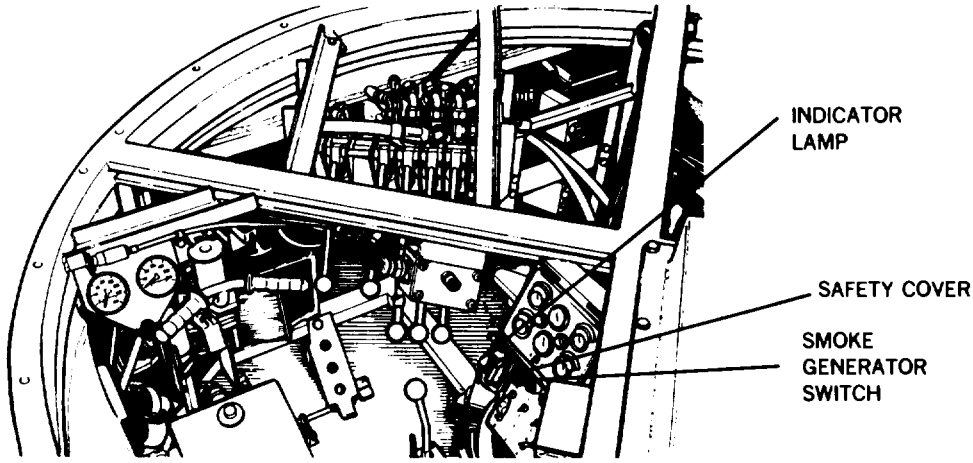
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:.
14	Semiannual	Brake Controls		
			WARNING Driver must notify all personnel that brake check is to take place so they can be prepared for sudden stops.	
			Move vehicle forward at 10-15 mph (16-24 kph) on level surface.	
			Apply brake pedal for both normal and sudden stops.	Vehicle fails to stop.
			Check for straight stopping of vehicle.	
			Adjust track tension (TM 5-5420-202-10) if vehicle does not stop in a straight line.	
15	Semiannual	Parking Brake	If possible, position vehicle on steep incline and engage parking brake.	
			Check that parking brake holds vehicle when brake pedal is released.	Parking brake will not hold.
			Adjust parking brake if required (page 13-132).	
16	Semiannual	Tachometer and Speedometer	Check that tachometer and speedometer dial readings are not erratic.	Tachometer inoperative or erratic.



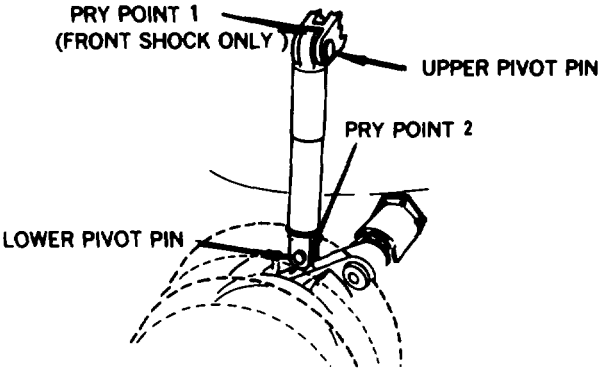
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
17	Semiannual	Engine Smoke Generator (If equipped)	Set engine speed at 1600 rpm. Lift toggle switch safety cover. Place SMOKE GENERATOR switch to ON position. Check that indicator lamp lights. Have commander check for smoke emission from engine exhaust pipes. If smoke is not observed within 10 seconds, system is defective. Place SMOKE GENERATOR switch to OFF position.	Smoke is not observed within 10 seconds.



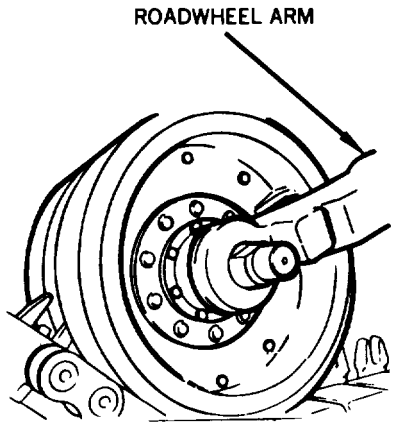
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location / Item to Check/Service	Procedure	Not Fully Mission Capable if:
18	Semiannual	Shock Absorbers (Left and Right sided	AFTER ROAD TEST	
			WARNING To prevent in jury, use care, shock absorbers may be extremely hot.	
			Visually check for missing, cracked, bent, leaking, dented, or broken shock absorbers.	Any cracked, broken, bent, or missing shock absorbers. Dents that hinder shock absorber operation. Any clam III leak.
			Check wear of shock absorber upper and lower pivot Pins by inserting pinch bar between shock absorber eye and hull mounting yoke (pry point 1). Pry down on shock absorb er and observe pins. Insert bar between shock absorber mounting yoke and roadwheel arm mounting eye (pry point 2). Pry up on shock ab sorber and observe pine. If pins move more than 1/8-inch (0.32 cm) while prying up or down, replace defective pins (page 14-93).	

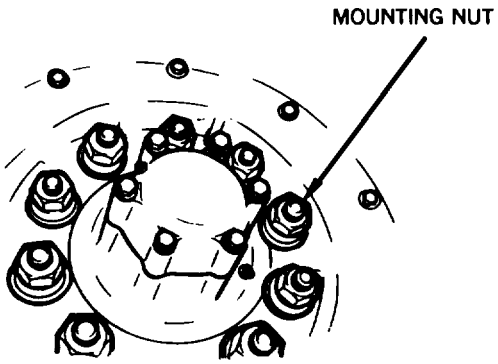


Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
19	Semiannual	Compensating Idlerwheels, Roadwheels, Arms and Hubs (Left and Right Sides)	Check all roadwheel arms for cracks, bends or damage. Using 0 to 1200 lb-ft torque multiplier check that all nuts are tightened to at least 550 lb-ft (746 N•m) dry.	Any bends or cracks.



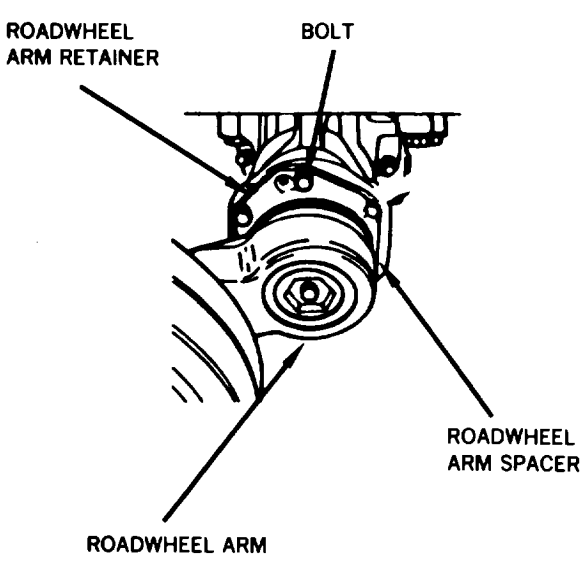
ROADWHEEL (INSIDE)

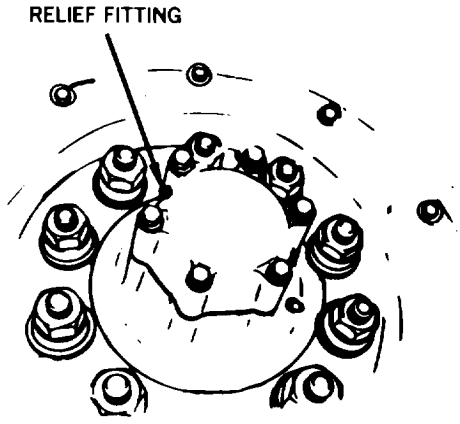


ROADWHEEL (OUTSIDE)

Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
19	Semiannual	Compensating Idlerwheels, Roadwheels, Arms and Hubs (Left and Right Sides) - Continued	Check for crushed or defective roadwheel arm inner and outer bearings at inside of roadwheel as follows:	
			Using a 3/4 inch socket and socket wrench, check that socket fits on top three bolts of roadwheel arm of retainer. If bearings are damaged or defective, socket will not fit or will be a very difficult fit.	Socket will not fit or is very difficult to fit any top three bolts.
			Looking straight-on at the roadwheel arm, check the gap between the roadwheel arm retainer and the roadwheel arm spacer. Gap should be equal (approximately 1/4in) (0.635 cm) all the way around. If gap is smaller at top and greater at bottom, check for bearing damage, bearing dislocation, or a loose bearing assembly retainer nut. Correct defect. Clean grease from seal assembly. Clean lubricant pressure relief fitting using a clean, lint-free, dry cloth.	





Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
19	Semiannual	Compensating Idlerwheels, Roadwheels, Arms and Hubs (Left) and Right Sides) - Continued		

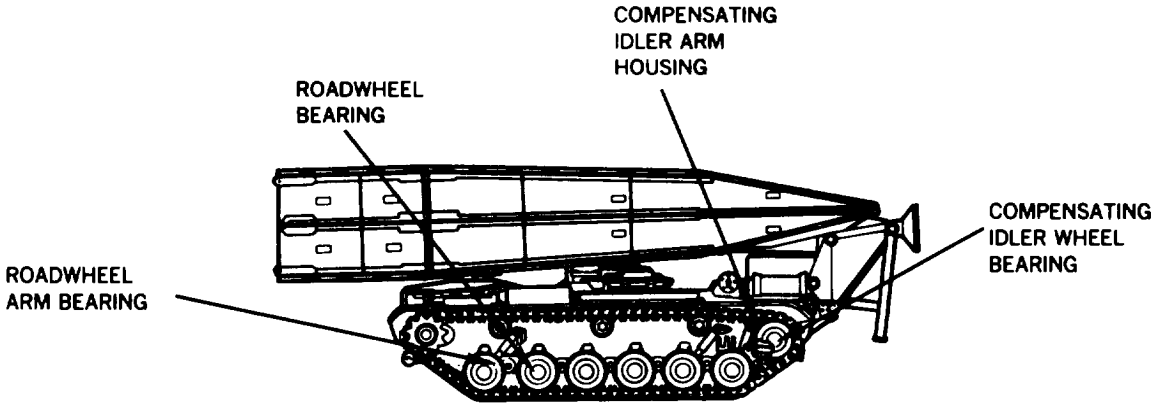
WARNING

- Dry Cleaning Solvent P-D-MO is toxic and flammable. To avoid injury, wear protective goggles and gloves and use in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Do not use near open fire or excessive heat. The flash point for Type I Dry Cleaning Solvent is 100°F (36°C), and for Type II is 140°F (60°C). If You become dizzy while using Dry Cleaning Solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.
- Compressed air for cleaning purposes should not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).

		Check compensating idler wheel bearings and roadwheel bearings relief fittings for proper operation. Plunger type fittings are checked by pulling up on plunger. Plunger should move freely. Ball-type fittings should be checked to ensure that the two relief ports are open. If plunger does not move freely or relief ports are not open, remove and thoroughly clean in dry cleaning solvent (P-D 680). Dry with compressed air or lint free cloth. Verify that ball moves and ports are open. Apply lubricant until it appears at lubricant pressure fitting. No lubricant should appear at seal assembly. Wipe off excess lubricant from relief valve.	

Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
19	Semiannual	Compensating Idlerwheels, Roadwheels, Arms and Hubs (Left and Right Sides) - Continued	Lubricate roadwheel arm bearings (Six fittings) until clean lubricant appears between arm retainer and arm. Wipe off excess grease. Lubricate compensating idler arm housing until clean lubricant appears at relief vent.	



Suspension Lubricant

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Compensating Idler Wheel Bearings		AR	S	0.5
Compensating Idler Arm Housing		AR	S	0.5
Roadwheel Bearings All Temperatures	WTR (G-395) MIL-G-81322	AR	S	0.5

For arctic operation, see FM 9 207

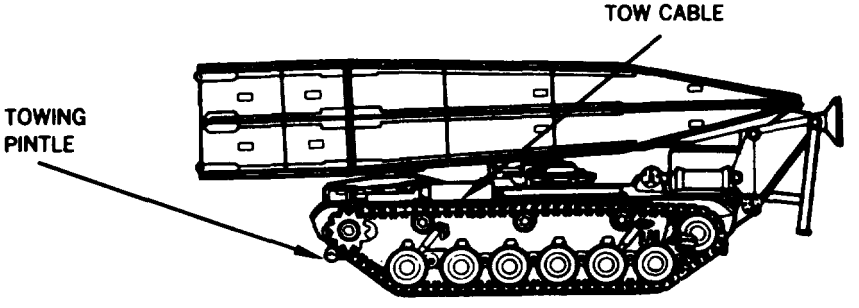
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
20	Semiannual	Towing Pintle and Tow Cables	Lubricate tow pintle (3 fittings).	

WARNING

Dry Cleaning Solvent P-D-680 is toxic and flammable. To avoid injury, wear protective goggles and gloves and use in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Do not use near open fire or excessive heat. The flash point for Type I Dry Cleaning Solvent is 100°F (38°C), and for Type II is 140°F (60°C). If you become dizzy while using Dry Cleaning Solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

Clean tow cables with dry cleaning solvent (P-D-680) and coat with corrosion preventive compound (MIL-C 16173, Grade I).



Tow Cables and Towing Pintle Lubricants

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Tow Cables	N/A (N/A) MIL-C-16173	AR	S	0.1
Towing Pintle All Temperatures	WTR (G-395) MIL-G-81322	AR	S	0.5

For arctic operation, see FM 9-207

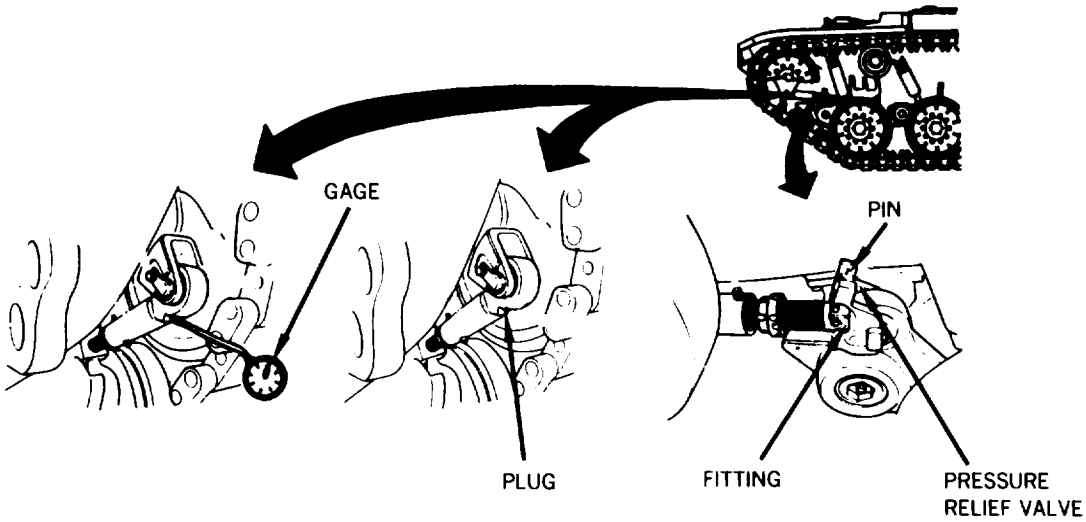
Preventive Maintenance Checks and Services for M60A1 AVLB Hull- Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	**Not Fully Mission Capable if:**
21	Semiannual	Grease Actuated Track Adjusting Links (Left and Right Sides)	Check that grease fitting, pressure relief valve, and plug are not damaged or missing.	

WARNING

To avoid personal injury due to high pressure grease, pressure must be reduced to zero before gage is attached to adjusting link.

	Check pressure relief valve as follows: 1. Pry up and hold pin on pressure relief valve until grease stops flowing. 2. Remove plug and install gage (Item 30.1, Chapter 3, Section I) into opening. 3. Attach grease gun to grease fitting. 4. Pump grease into adjusting link until grease comes out of pressure relief valve.	Pressure relief valve does not hold pressure or does not bleed at proper pressure.



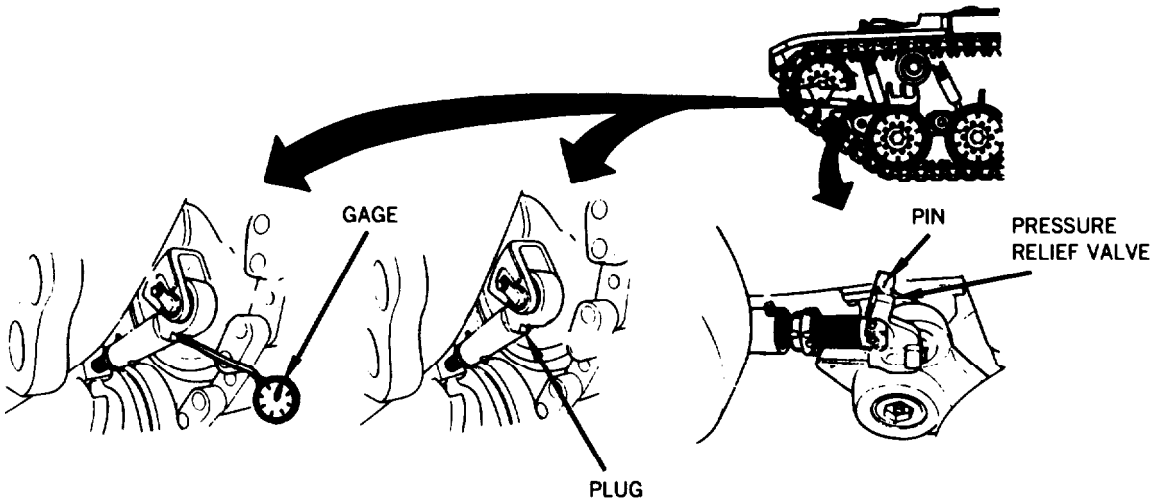
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
21	Semiannual	Grease Actuated Track Adjusting Links (Left and Right Sides) - Continued	5. Note pressure on gage when grease first starts to come out of pressure relief valve. 6. If gage indicates less than 2150 psi, replace relief valve (page 14-106) and repeat steps 4 and 5. 7. If gage indicates 2150-2250 psi, pressure relief valve is serviceable, proceed to step 8.	

WARNING

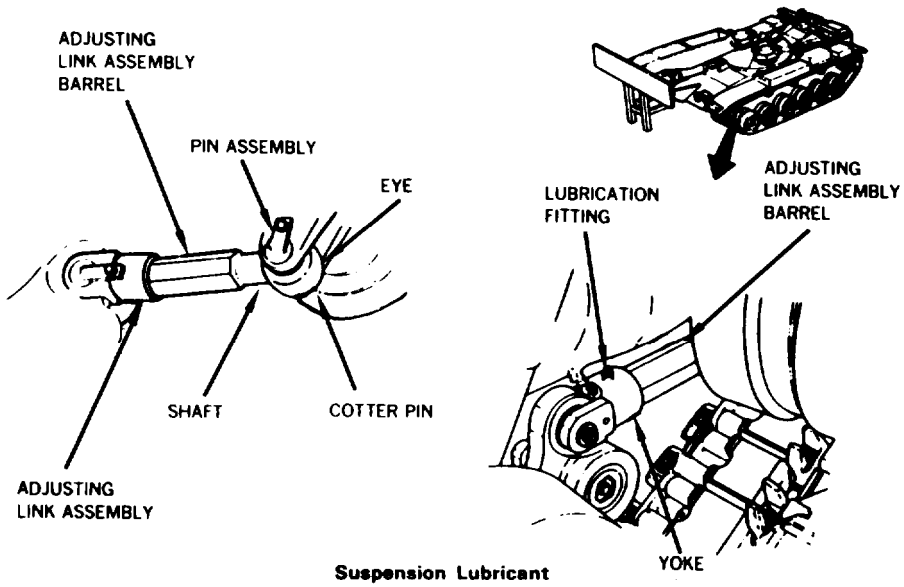
To avoid personal injury due to high pressure grease, pressure must be reduced to zero before gage is removed.

		8. Pry up and hold pin on pressure relief valve until grease stops flowing. 9. Remove gage and install plug. 10. Adjust track tension (TM 5-5420-202-10).	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
22	Semiannual	Mechanical Track Adjusting Links (Left and Right Sides)	Check track adjusting link assemblies for broken or missing cotter pin, lubrication fitting and pin assemblies. Check adjusting link assembly barrel, shaft, eye and yoke for cracks.	
			NOTE Pin at roadwheel arm maybe installed with head of pin facing toward hull.	
			Lubricate until clean lubricant appears between barrel and shaft.	



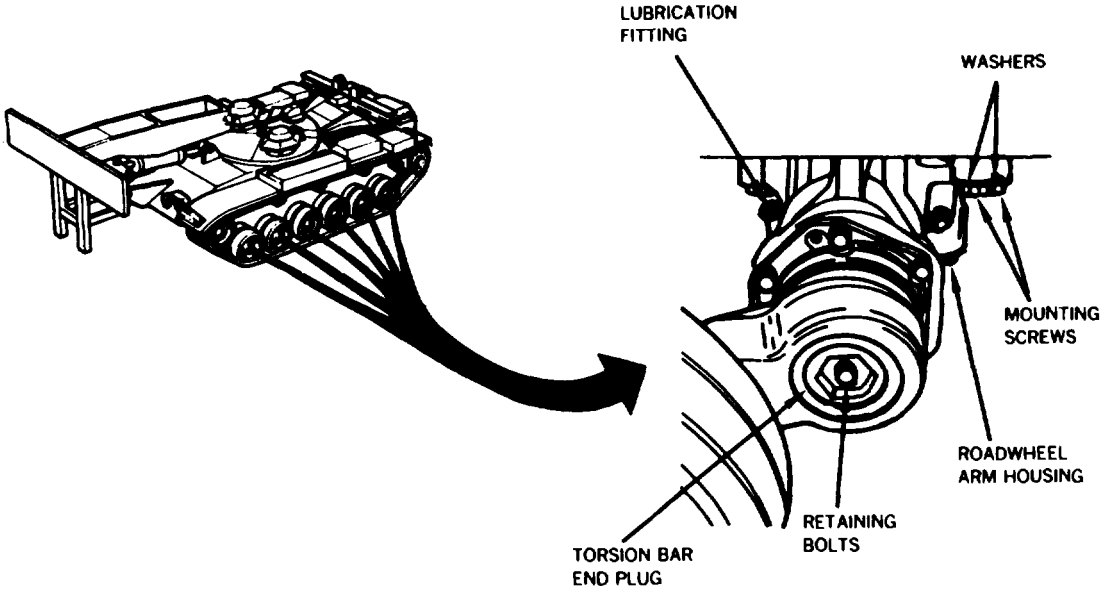
Suspension Lubricant

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Mechanical Track Adjusting Link All Temperatures	**WTR** (G-395) MIL-G-81322	AR	S	0.1

For arctic operation, see FM 9-207

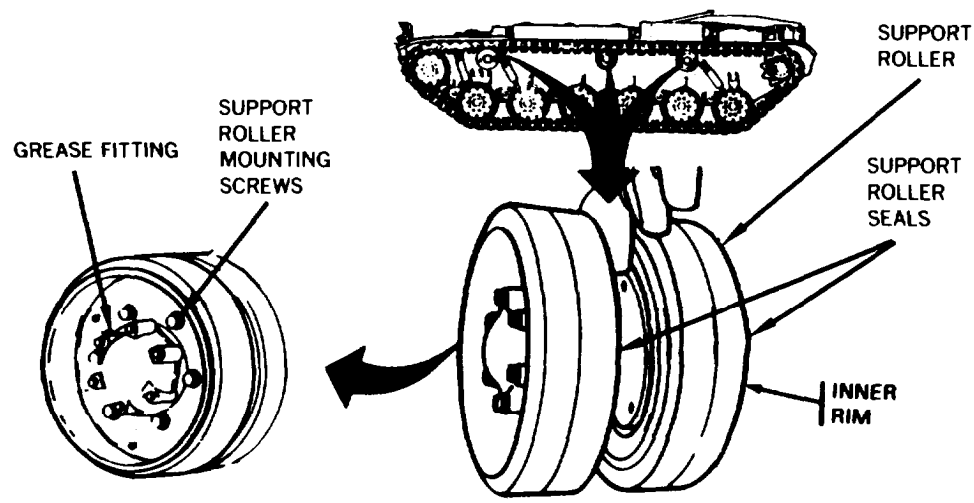
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
23	Semiannual	Roadwheel Arm Housings (Left and Right Sides)	Check that roadwheel arm housings, mounting screws, washers, and lubrication fittings are not damaged or missing. Make sure that mounting screws are not backed out of mounting holes.	Roadwheel arm housing damaged.
			NOTE If mounting screw must be tightened, replace lockwasher before tightening screw.	
			Using a 0-600 lb-ft torque wrench, tighten replaced or loose mounting screws to 450-470 lb-ft (610-637 N•m). Check that screws are not loose, damaged, or missing. Check that torsion bar end plugs are fully seated and retaining bolts are secure.	



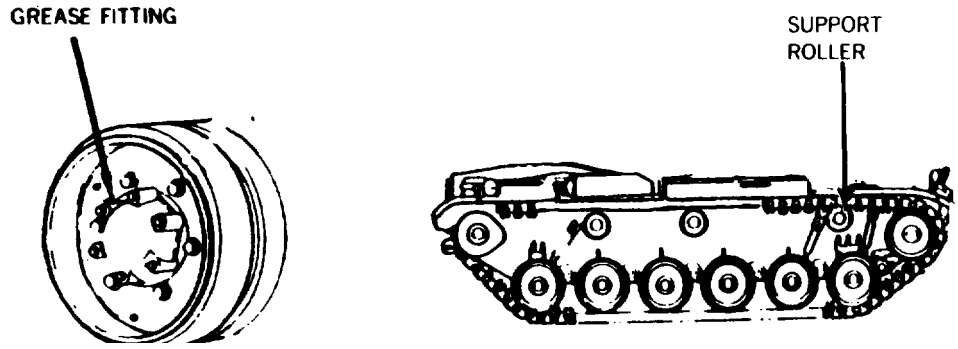
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
24	Semiannual	Track Support Rollers (Left and Right Sides)	Check track support roller seals and bearings by inspecting inboard side of track support rollers for grease spattering along inner rim. If there is grease spattering on inner rim, clean all lubricant from behind the roller, seal, and along roller inner rim, check for space at bottom side of seal indicating worn or damaged bearings. If lubricant spattering is found, track support roller seal is defective. Replace defective seal (page 14-34). Check if support roller mounting screws and grease fitting are damaged or missing.	Any class III leak. Any worn or defective bearings.



Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
25	Semiannual	Track Support Roller Bearings	Lubricate (three fittings) until lubricant can be felt at seal behind roller. Wipe off excess lubricant from behind roller, seal, and along inner rim.	Any class III leak.



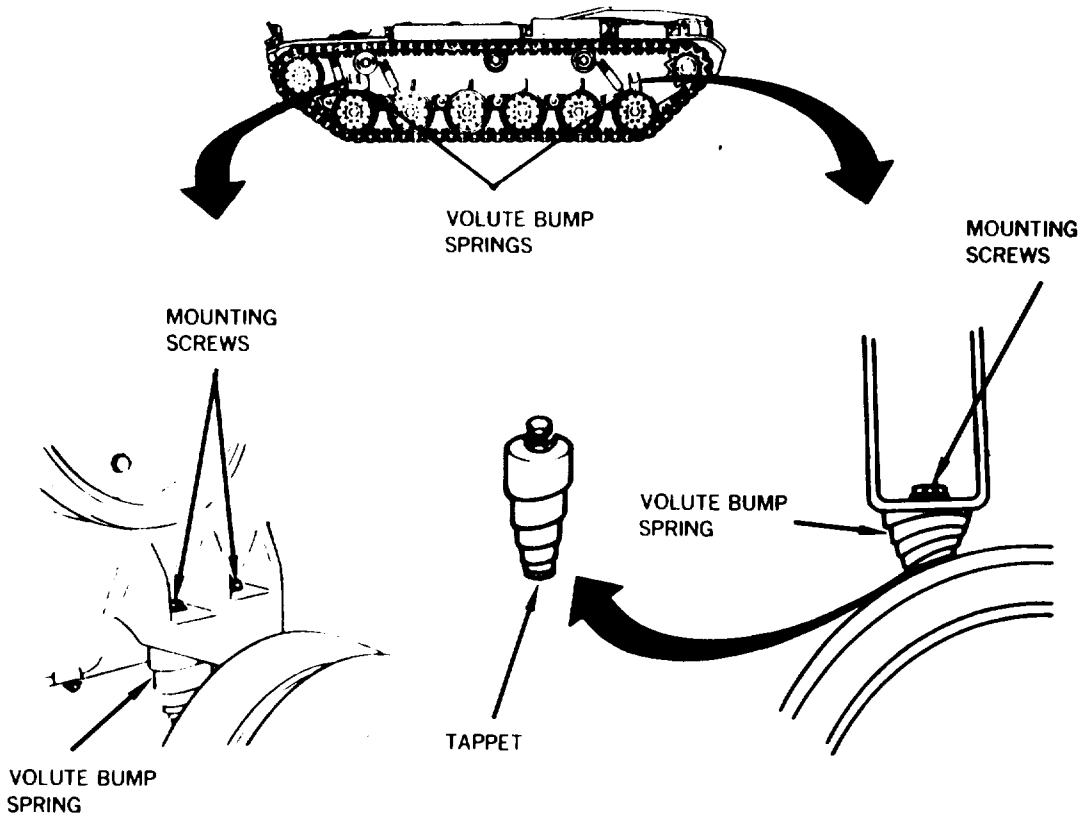
Track Support Roller Bearirgs Lubricant

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Track Support Roller Searings All Temperatures	WTR (G-395) MIL-G-81322	AR	S	0.2

For arctic operation, see FM 9-207

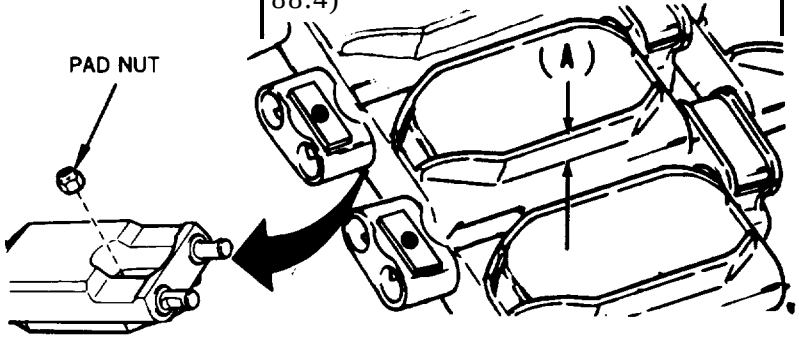
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

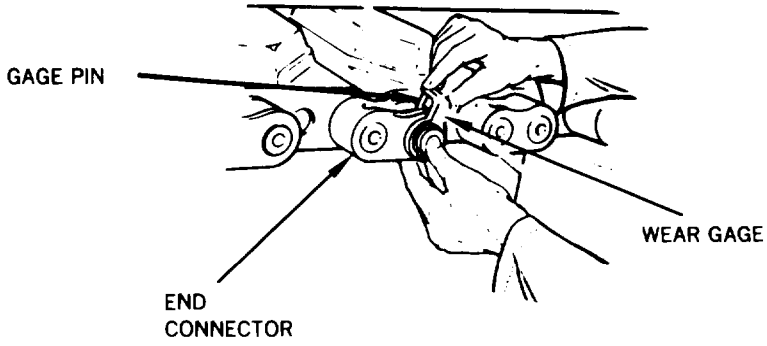
Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
26	Semiannual	Volute Bump Springs (Left and Right Sides)	Check if volute bump springs are broken, cracked, deformed, or missing. Check that volute bump spring tappet is not damaged or missing. Check that mounting screws are tightened to at least 160 lb-ft (217 N•m).	Broken or missing springs.



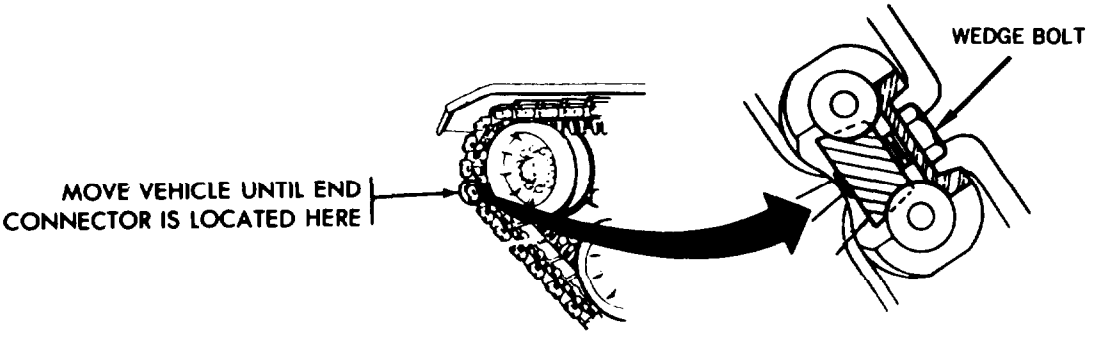
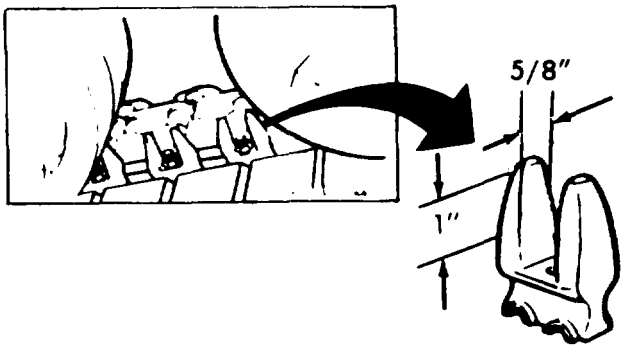
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
27	Semiannual	Track Shoes and Grousers (Left and Right Sides)	Check that pad nut on replaced track shoe is tightened to 240-270 lb-ft (325-366 N•m). Measure metal grouser height (A). If grouser is less than 1/4-inch (0.635 cm), replace track shoe (page 14-88.4)	
28	Semiannual	Track End Connectors (Left and Right Sides)	To inspect end connectors, position wear gage (Item 10, Chapter 3, Section I) on end connector. WARNING To avoid personal injury, wear goggles when hitting bolt or end connector with hammer. Turn gage around both end surfaces of connector and depress gage pin at several positions. Check that pin touches at each position. If pin touches at each position, end connector is okay. If pin does not touch, end connector is worn.	End connectors are worn or missing.



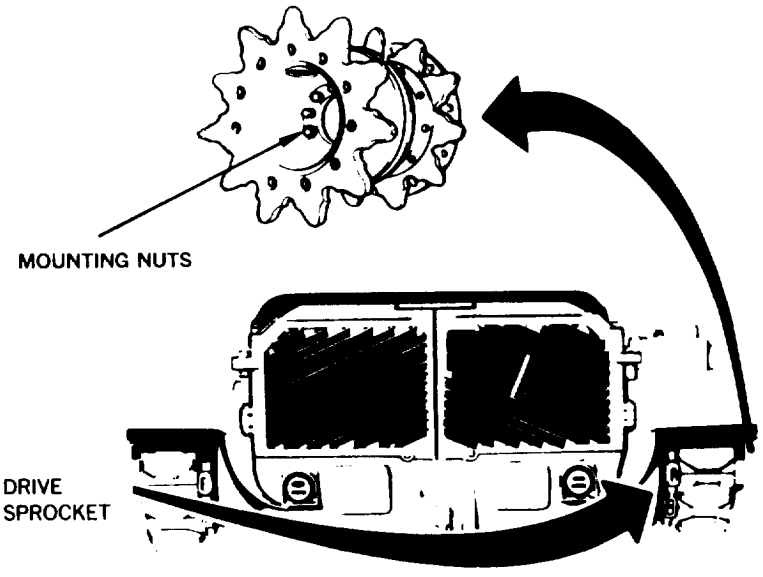


Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
29	Semiannual	Track Wedge and Wedge Bolts (Left and Right Sides)	Check that all wedge bolts are tightened to 140-160 lb-ft (190-217 N•m).	Loose or missing Wedges/bolts.
				
30	Semiannual	Centerguides (Left and Right Sides)	Move vehicle as necessary to gain access to center guide(s).	
			Measure down 1 inch (2.54 cm) from top of centerguide.	
			Check that centerguide thickness measures 5/8 in (1.6 cm) or more. Replace if less than 5/8 in (1.6 cm).	Worn centerguide.
			Check that centerguide nuts are tightened to at least 300 lb-ft (407 N•m).	Loose or missing centerguide nuts.
				

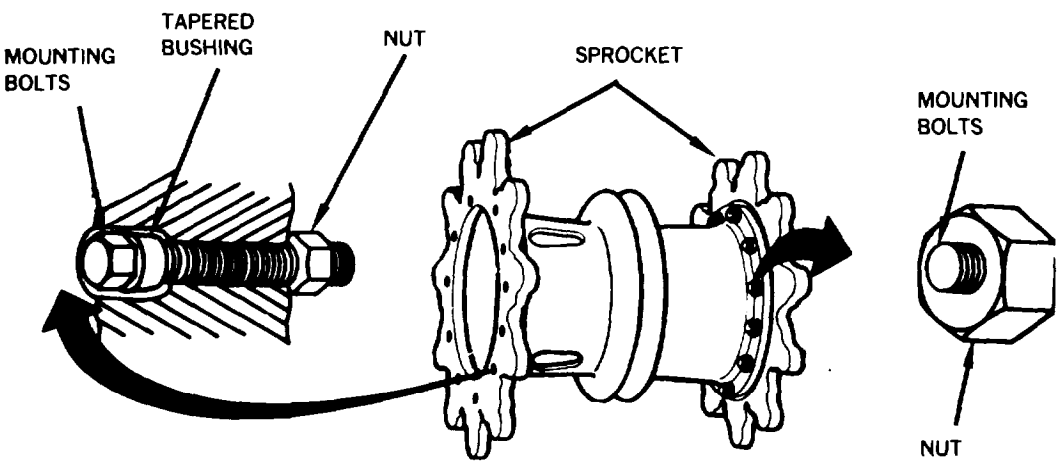
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
31	Semiannual	Sprocket Hub Left and Right Sides)	Check that final drive hub mounting nuts are tight. Do not tighten loose mounting nuts, replace them.	Any nuts missing or loose.
			Check that mounting holes are not egg-shaped (out of round). Shiny areas next to mounting nuts indicate out of round holes.	Mounting holes are out of round.
			Use a 0-600 lb-ft torque wrench to tighten replacement nuts to 450-470 lb-ft (610-637 N•m).	
			Visually check final drive output seal for leaks by inspecting lower part of inboard side of drive sprocket for evidence of oil. If oil is present, notify support maintenance final drive seal is defective.	Any class III leak.



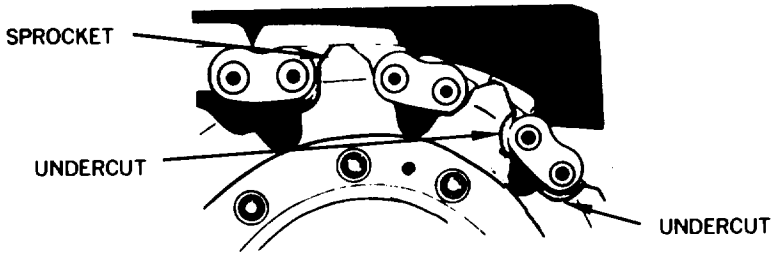
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

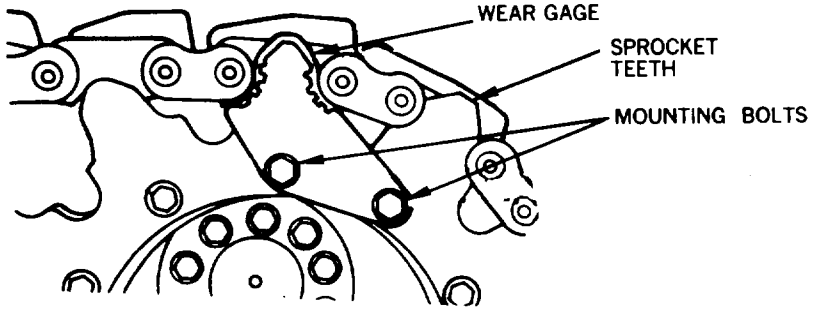
Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
32	Semiannual	Drive Sprockets (Left and Right Sides)	Move vehicle as needed to perform sprocket checks. Visually check that nuts for both inside and outside sprockets have not backed off mounting bolts. (Each bolt should stick out of nut about same distance.) Do not tighten loose nuts and bolts, replace them. When replacing nuts and bolts, also replace tapered bushings. Lightly lubricate replacement bolts and thread into hub through bushings into sprocket. Tighten bolts to 140-190 lb-ft (190-257 Nom). Tighten replacement nuts to 115-165 lb-ft (156-224 N•m).	Any nuts are missing or loose.



Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
32	Semiannual	Drive Sprockets Left and Right Sides) - Continued	Check sprocket teeth for wear by looking at undercut on sprocket (undercut is located on two teeth). Sprocket teeth are excessively worn if wear has reached bottom of undercut. If sprocket is not equipped with undercut indicators, use wear gage (Item 28, Chapter 3, Section I) to measure wear on driving side of sprocket teeth. If sprockets have been reversed, use side "B" of gage. If not, use side "B" of gage. Place wear gage over two mounting bolts and check for wear. Sprocket teeth are excessively worn if wear has reached bottom of any notch on gage. If sprocket teeth are excessively worn, reverse or replace sprocket (page 14-72).	Sprocket teeth are excessively worn on both sides.





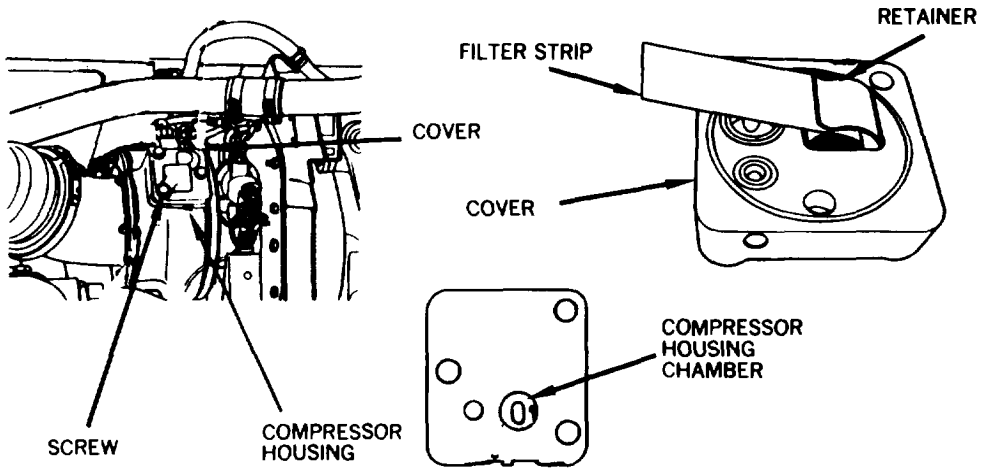
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
33	Semiannual	Dust Detector Filter Strip (Left and Right Sides) (If Equipped)		

NOTE

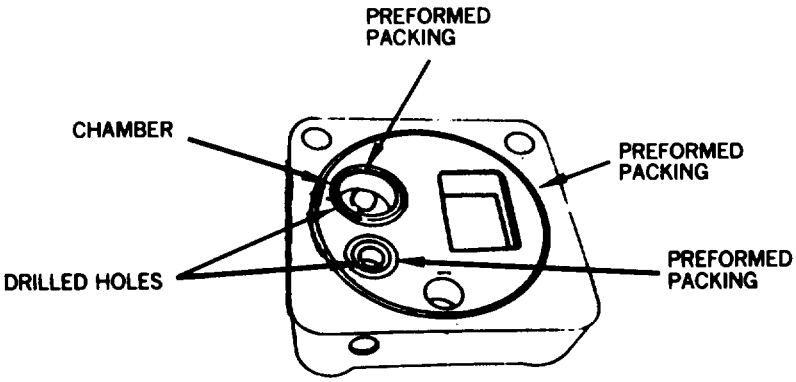
Service dust detector filter strip quarterly, or after 750 miles of operation, or when dust detector indicates ingestion of foreign matter.

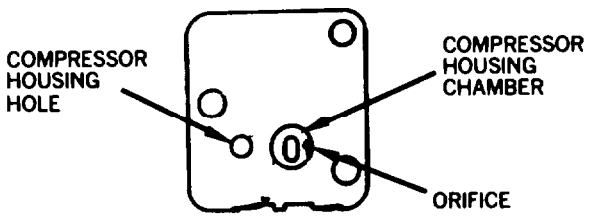
	Open top deck grille doors (TM 5-5420-202-10). Remove dust and dirt from filter strip cover and compressor housing. Loosen three screws securing filter strip cover to compressor housing. Remove cover. Remove filter strip with retainer from filter strip cover (page 7-130.11). Clean cover and mounting face of compressor housing. Inspect compressor housing chamber for contamination. Clean chamber as required.	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

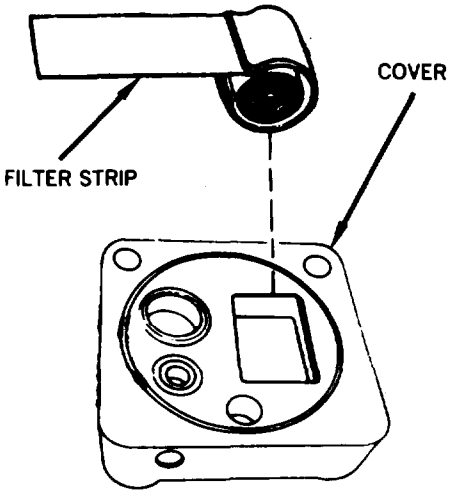
Item No.	Internal	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
33	Semiannual	Dust Detector Filter Strip (Left and Right Sides) (If Equipped) - Continued	Using pipe cleaner (Item 75, Appendix D), clean compressor housing chamber. Use a small (not more than 0.030 inch diameter) wire to clean orifice. Blow out chamber and orifice by mouth using a short piece of tubing (Item 78, Appendix D). Blow out (by mouth) compressor housing hole. Inspect cover chamber for contamination. Clean chamber as required. Using pipe cleaner (Item 75, Appendix D), clean drilled holes and blow out (by mouth). Replace three preformed packings (page 7-130.13).	

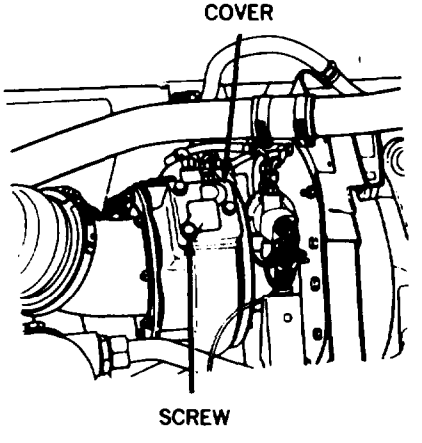




Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

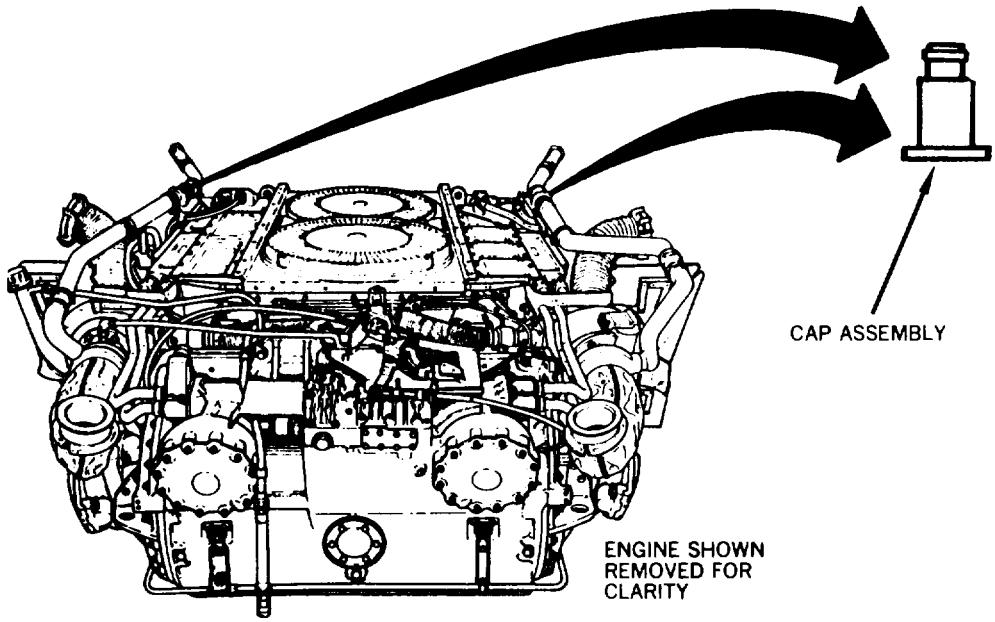
Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
33	Semiannual	Dust Detector Filter Strip (Left and Right Sides) (If Equipped) - Continued	Service dust detector filter strip. Cut off approximately 2-inches from end of filter strip. Pull filter strip so that approximate ly 1/2-inch will extend past edge of cover when falter strip is installed. Install filter strip and retainer in cover. Filter strip must be approxi-mately 1/2-inch past edge of cover. Ensure all orifices are clean. Install cover. Tighten three screws. Perform dust detector operational test (page 10-298.17).	





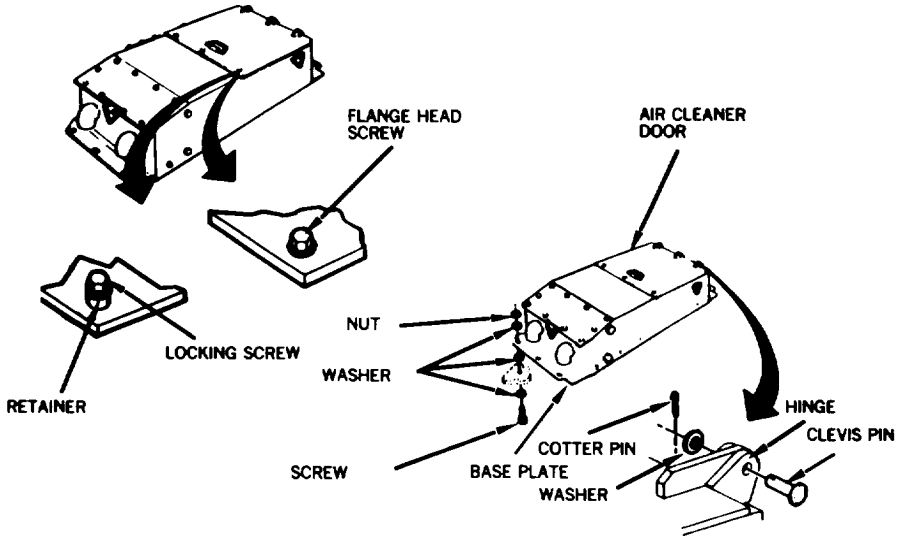
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
34	Semiannual	Vehicle Exhaust Dust Ejector System (VEDES) (If Equipped)	Remove cap assembly (page 8-14). Inspect cap assembly to make sure flapper is not sticking or broken. If sticking or broken, install new cap assembly (page 8-16). Install cap assembly (page 8-16).	



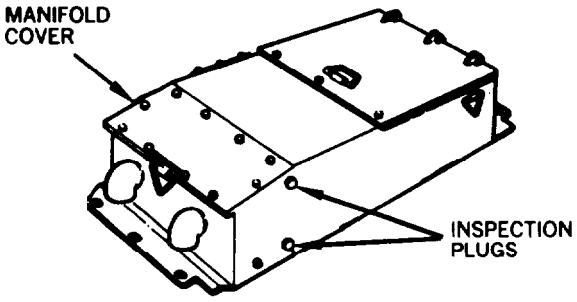
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

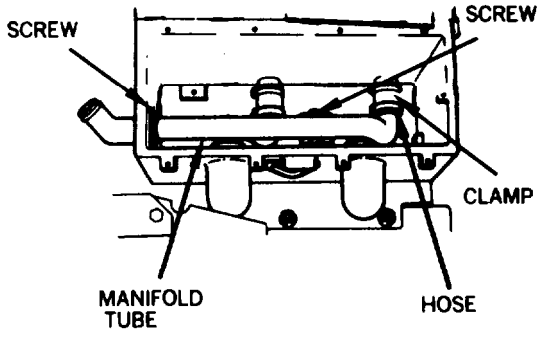
Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
36	Semiannual	Air Cleaners (Left and Right Sides)		
			NOTE Air cleaners doors are equipped with either locking screws and retainers or with flanged-head screws.	
			Check air cleaner door for loose or missing screws or damaged retainers. Replace missing or damaged door screws or retainers. Make sure screw holes are free of dirt. Check that clevis pins, washers, or cotter pine are not missing from hinges. Check that base plate is secured to tank outrigger by six screws, 18 washers, and six nuts. Check that hinges are not cracked. Check that access plate mounting screws are not loose or missing.	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

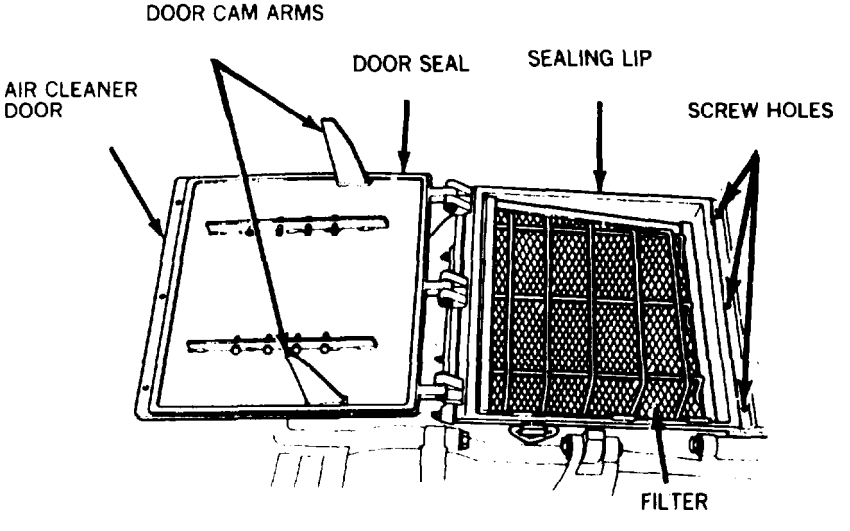
Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
			WARNING When using compressed air, use effective chip guarding and personal protective equipment (goggles/shield, gloves, etc.).	
35	Semiannual	Air Cleaners (Left and Right Sides) - Continued	Remove two inspection plugs. Using V-pack cleaner (Item 5, Chapter 3, Section I), direct compressed air into upper hole until air coming out of lower hole is free of dirt. If equipped with Vehicle Exhaust Dust Ejector System (VEDES), perform the following Remove manifold cover (page 7-148.2). Check that four clamps are not loose, damaged, or missing. Check that two hoses are not damaged or loose. Check that six mounting screws are not loose or missing. Check that manifold tube is not damaged. Install manifold cover (page 7-148.3).	





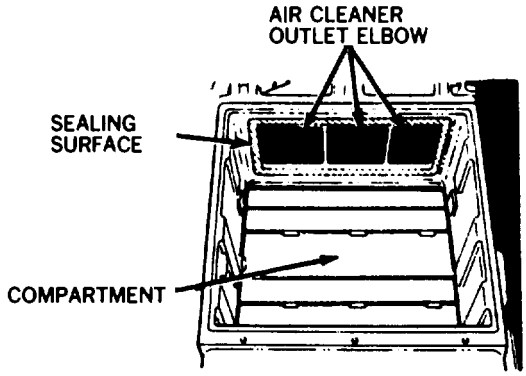
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
35	Semiannual	Air Cleaners (Left and Right Sides) - Continued	Open air cleaner door (page 7-97). Check that door cam arms are not bent, cracked, or missing. Check that air cleaner door seal is not hardened, damaged, missing, or does not have indentations. Check that screw holes are drilled through and free of dirt or obstructions. Check that sealing lip on housing is not damaged. If housing sealing lip is damaged, notify support maintenance. Remove filter.	



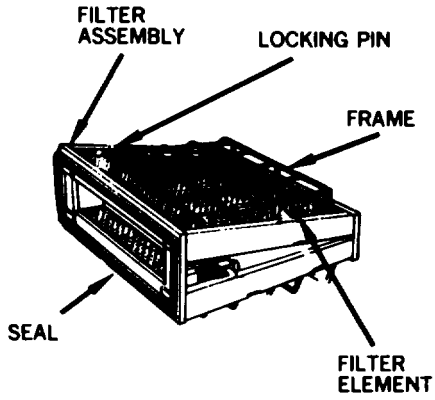
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
35	Semiannual	Air Cleaners (Left and Right Sides) - Continued	Check compartment for internal cracks and damage.	
			Check filter element sealing surface for dirt damage that would prevent proper sealing of falter element.	Element is damaged.
			NOTE Dust trails in the outlet elbow maybe caused by damaged seal between air cleaner and outlet elbow, missing air restriction indicator (if equipped), or damaged air filter element.	
			Check inside of air cleaner outlet elbow for dust trails.	

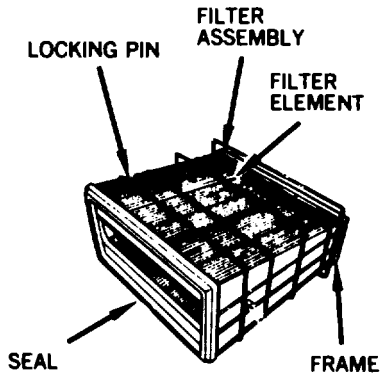


Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
36	Semiannual	Air Cleaners Filters (Left and Right Sides)	Service air cleaner falter assemblies (page 7-96). Check that seal is not hardened, cracked, damaged, missing, or does not have permanent indentations. Check that frame or either locking pin is not damaged or missing. Check falter element for ripe, holes, tears, or other damage.	Air filter seal is unserviceable.



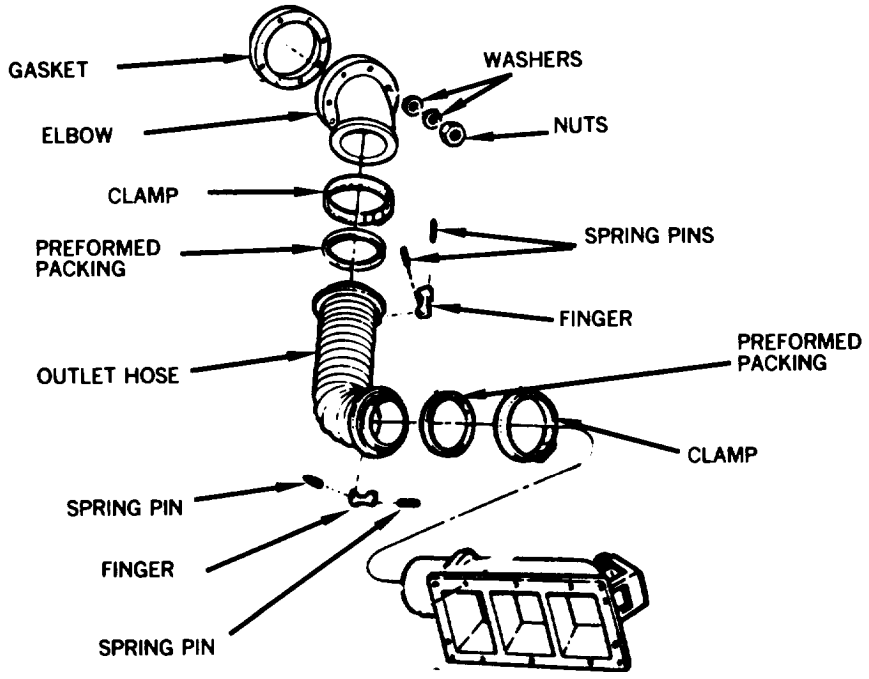
LATE MODEL



EARLY MODEL

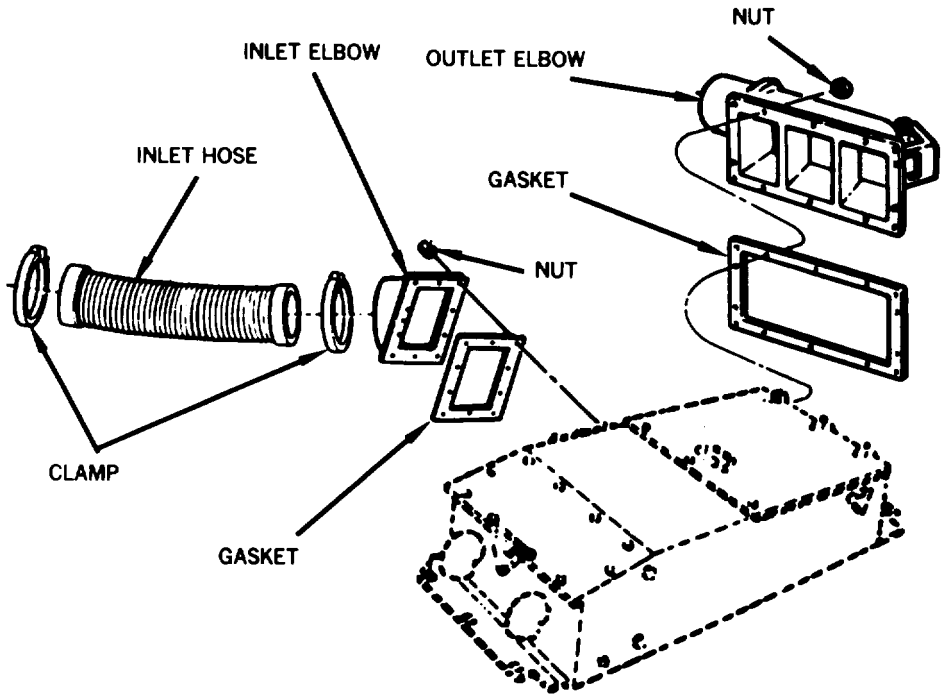
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
37	Semiannual	Air Cleaner Elbows, Hoses, and Clamps (Left and Right Sides)	Remove air cleaner outlet hose (page 7-84).	
			NOTE Dust trails in the outlet hose maybe caused by bad preformed packing, loose clamps, damaged outlet hose, or improper installation of hose.	
			Check that outlet hose is not cracked, torn, or leaking and that clamps are not loose or missing. Check that fingers and spring pins (if used) are not loose, damaged, or missing. Check that preformed packings are not hardened, cracked, or missing. Check that turbocharger elbow, gasket, washers, and nuts are not damaged or missing.	Cracked, tom leaking, or missing.



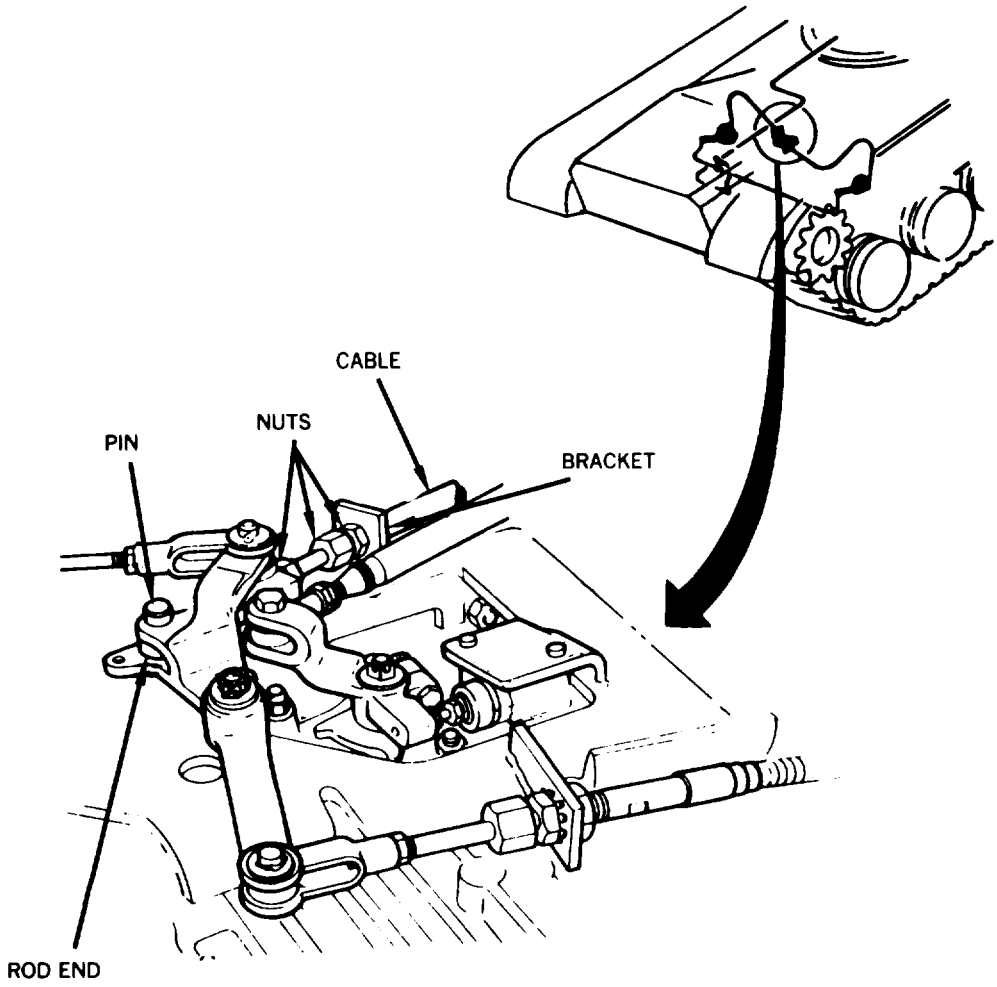
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
37	Semiannual	Air Cleaner Elbows, Hoses, and Clamps (Left and Right Sides) - Continued	Check that outlet elbow, inlet elbow, gaskets, and mounting nuts are not damaged or missing. Check that inlet hose is not torn or damaged, and that clamps are not damaged, loose, or missing. Install air cleaner outlet hose (page 7-85).	



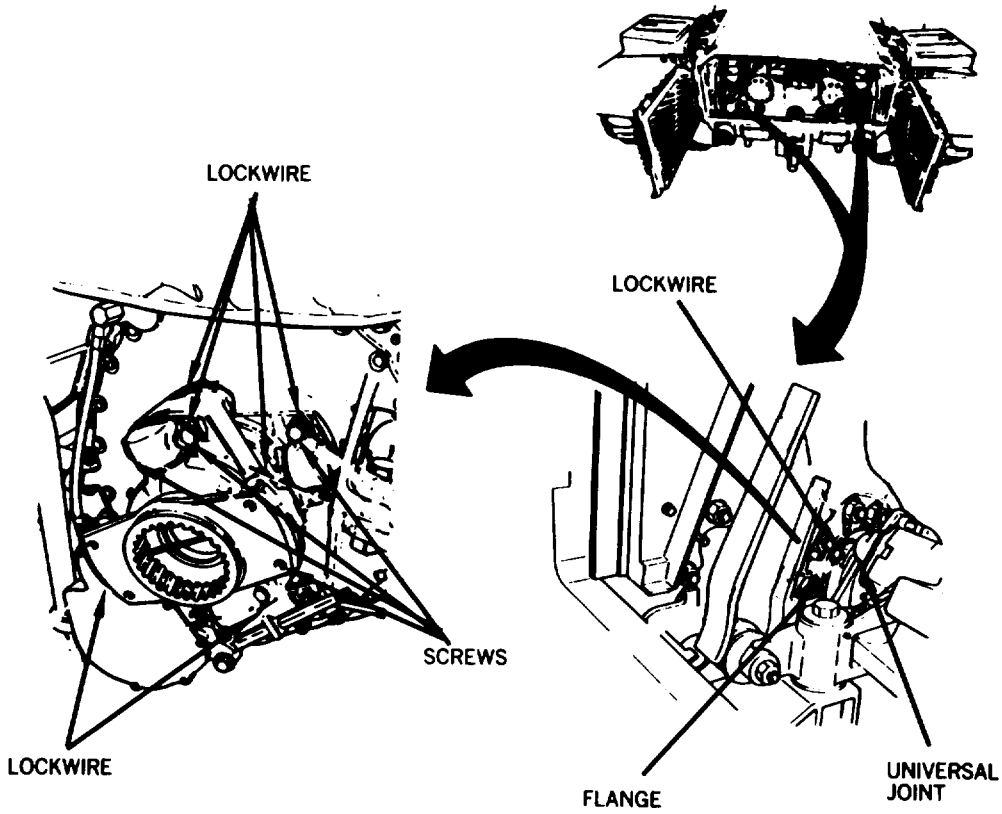
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
38	Semiannual	Parking Brake Control Linkage	Remove transmission shroud (page 9-2). Check parking brake linkage in engine compartment for binding, corroded or damaged cable. Check for broken or damaged bracket and rod end. Check nuts and pin for damage.	Parking brake inoperative.



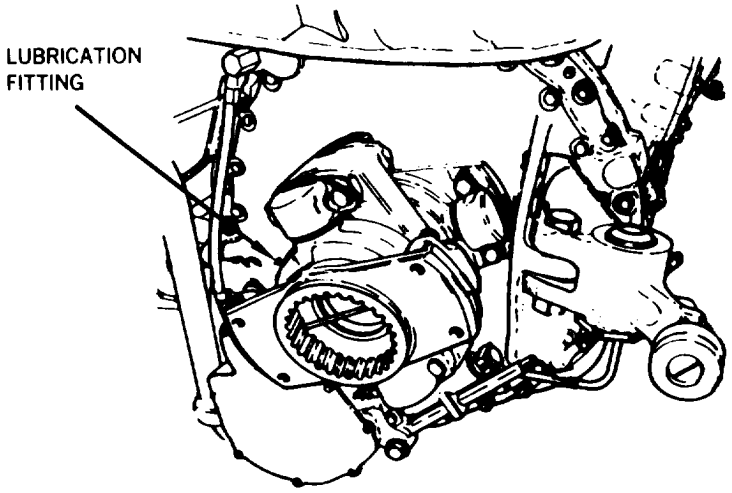
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
39	Semiannual	Final Drive Universal Joints and Disconnect Flanges (Left and Right Side)	Check universal joint and disconnect flanges for cracks and damage. Check for missing or broken lockwire. If lockwire is missing or broken, check that screws are tightened to at least 118 lb-ft (160 N·m). It may be necessary to remove power plant (page 5-1) before torque can be checked. Do not tighten loose screws, replace them. Tighten new screws to 118-128 lb-ft (160-173 N·m).	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
39	Semiannual	Final Drive Universal Joints and Disconnect Flanges (Left and Right Side) - Continued	Lubricate universal joints. If lubrication fitting holes are plugged with protective plugs, remove plugs and install lubrication fitting and lubricate. Leave fittings in universal joints.	



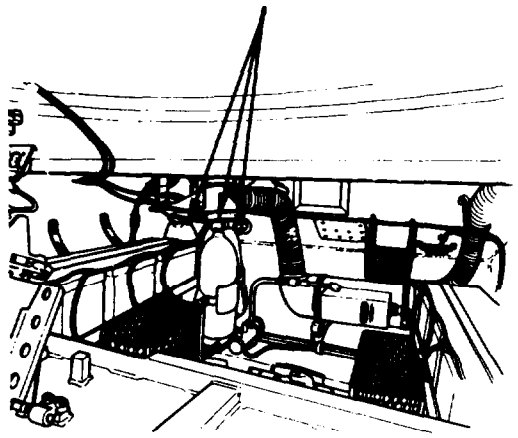
Final Drive Universal Joints Lubricant

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Final Drive Universal Joints All Temperatures	WTR (G-395) MIL-G-81322	AR	S	0.5

For arctic operation, see FM 9-207

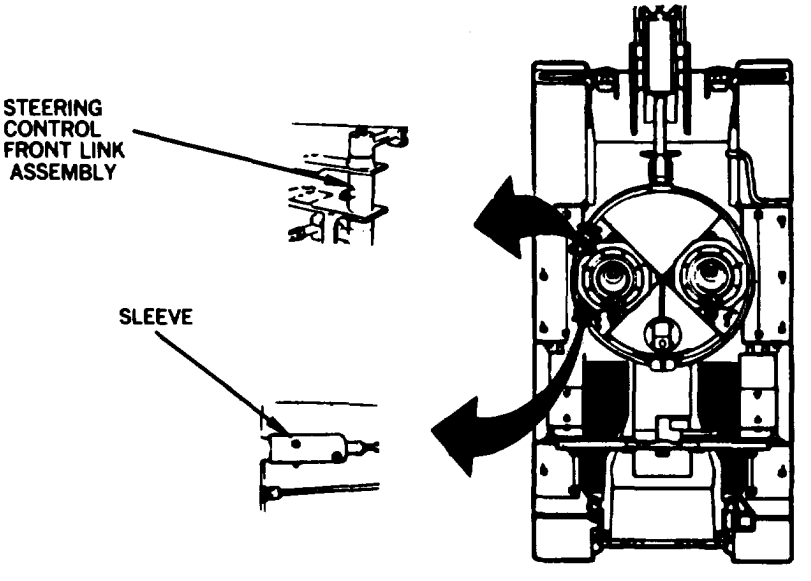
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
			WARNING **Handle charged cylinders with care. Do not jar or subject cylinders to temperatures above 140°F (60°C). Accidental discharge could result in injury or death to personnel.**	
40	Semiannual	**Fixed Fire Extinguisher System**	Remove three fixed fire extinguisher cylinders from vehicle and weigh (page 20-52). Check neck of cylinder for last pressure test date. If last pressure test was performed more than 5 years ago, replace fire extinguisher cylinder (page 20-52). Notify support maintenance fire extinguisher requires pressure test.	**Fire extinguisher cylinder is missing.** **Any fire extinguisher cylinder requires pressure test.**



Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
40	Semiannual	Fixed Fire Extinguisher System - Continued	While fire extinguishers are removed, lubricate steering control front link assembly and sleeve.	



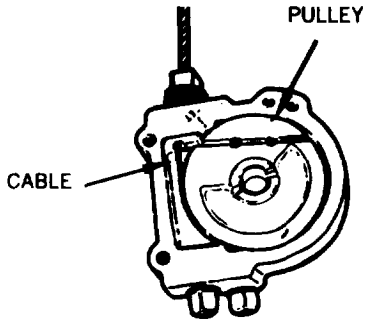
Steering Linkage Lubricant

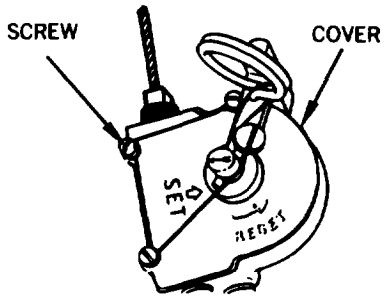
Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Steering Control Linkage Steering Linkage Sleeve All Temperatures	WTR (G-395) MIL-G-81322	AR	S	0.2

For arctic operation, see FM 9-207

Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
40	Semiannual	Fixed Fire Extinguisher System - Continued	Remove three screws securing cover and remove cover. Clean pulley mechanism and surrounding areas. Check for proper operation of actuator mechanism. Coat pulleys and cables with WTR.	





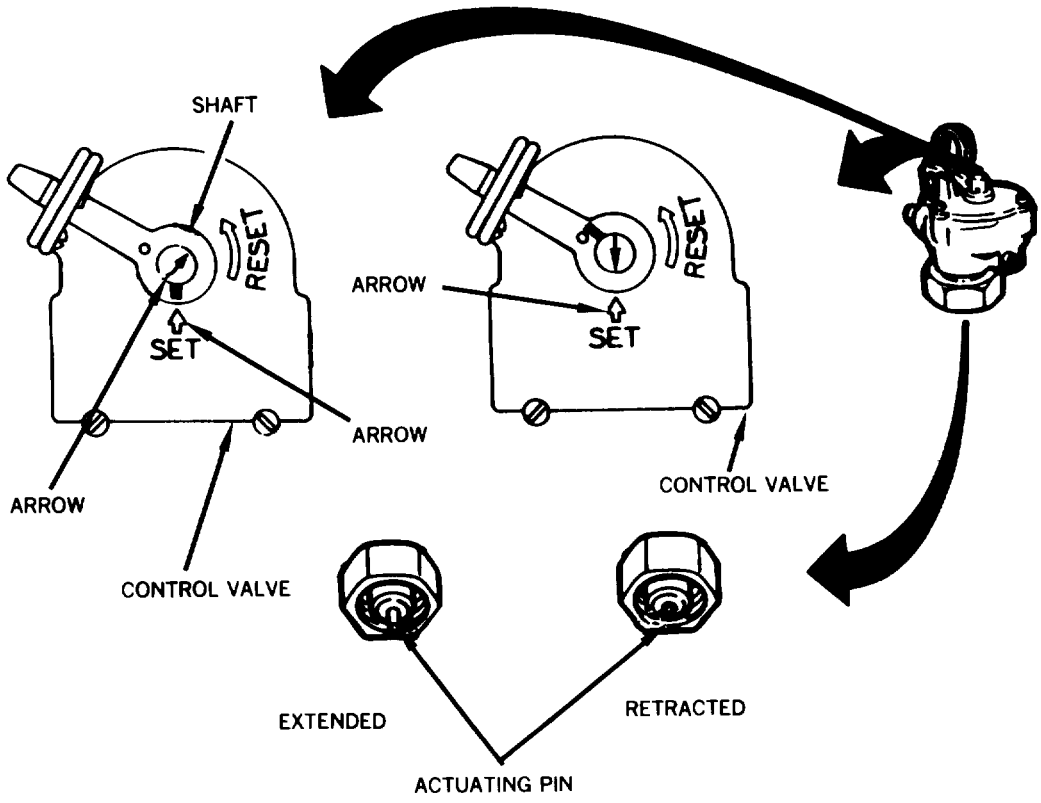
Fire Extinguisher Pulleys Lubricant

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Fire Extinguisher Pulleys All Temperatures	WTR (G-395) MIL-G-81322	AR	S	0.1

For arctic operation, see FM 9-207

Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
			WARNING Handle charged cylinders with care. Do not jar or subject cylinders to temperatures above 140°F (60°C). Accidental discharge could result in injury or death to personnel.	
40	Semiannual	Fixed Fire Extinguisher System - Continued	Reset control valves. Turn shaft counter-clockwise until arrow on cover end of shaft is aligned with SET arrow on cover. Check for retraction of actuating pins on control valves No.1 and 2.	



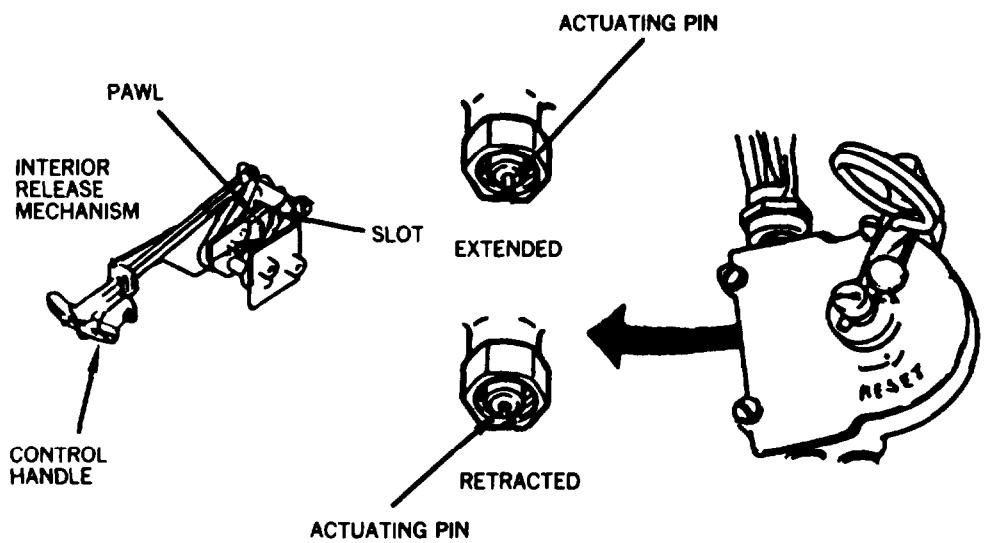
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
40	Semiannual	Fixed Fire Extinguisher System - Continued		

NOTE

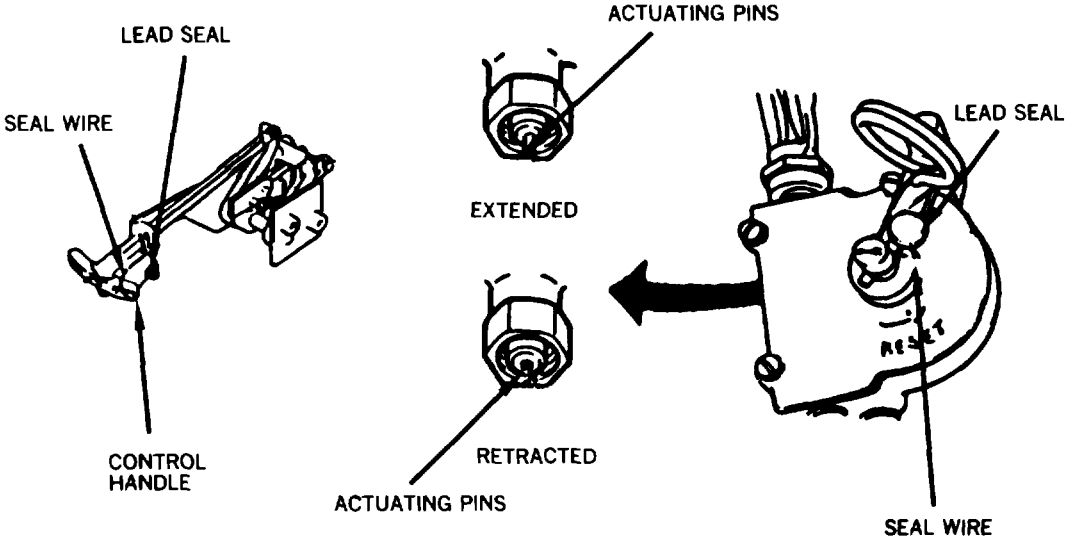
Control valves must be held firmly in position while handle is being pulled. If this is not done, control valves may not be actuated.

	Pull FIRE-PULL hard interior control handle and release.	
	Check for smoothness and freedom of action of cables and controls.	
	Check extension of actuating pin on control valve No. 1.	
	Push FIRE-PULL hard interior control handle and release again.	
	Check for smoothness and freedom of action of cables and controls.	
	Check for extension of actuating pin on control valve No. 2.	
	Reset control handle position pawl in slot.	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
40	Semiannual	Fixed Fire Extinguisher System - Continued	Reset control valves. Turn shaft counter-clockwise until arrow on end of shaft is aligned with SET arrow on cover. Check for retraction of actuating pins on control valves, No. 1 and 2.	
			CAUTION Use only approved seal wire. Do not use safety wire or lock wire. Do not make additional loops/runs for additional strength.	
			Install seal wire and lead seal on control valves No. 1 and 2 and interior release mechanism.	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
40	Semiannual	Fixed Fire Extinguisher System - Continued	Check each replacement cylinder for lead seal. Check each replacement cylinder for shrunk tubing over safety valve outlet. Replace cylinder if shrunk tubing is missing or broken.	

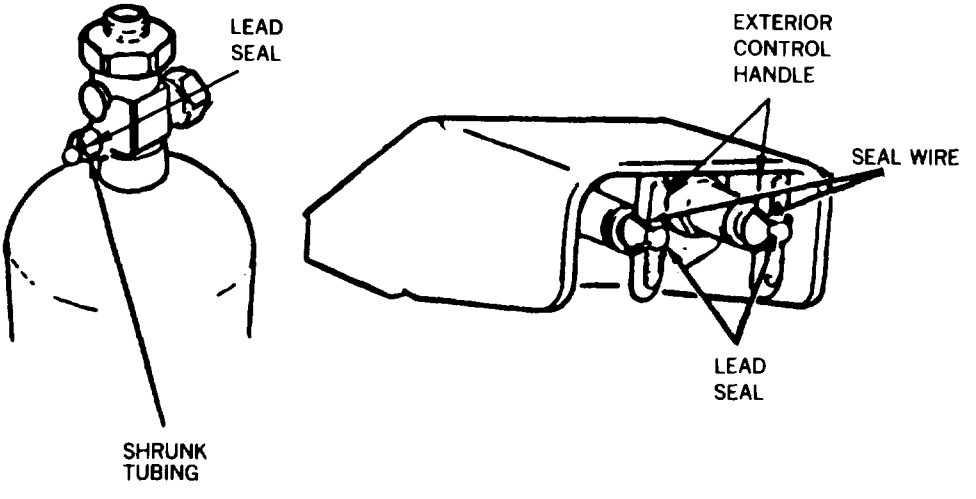
WARNING

Handle charged cylinders with care. Do not jar or subject cylinders to temperatures above 140°F (60°C). Accidental discharge could result in injury or death to personnel.

CAUTION

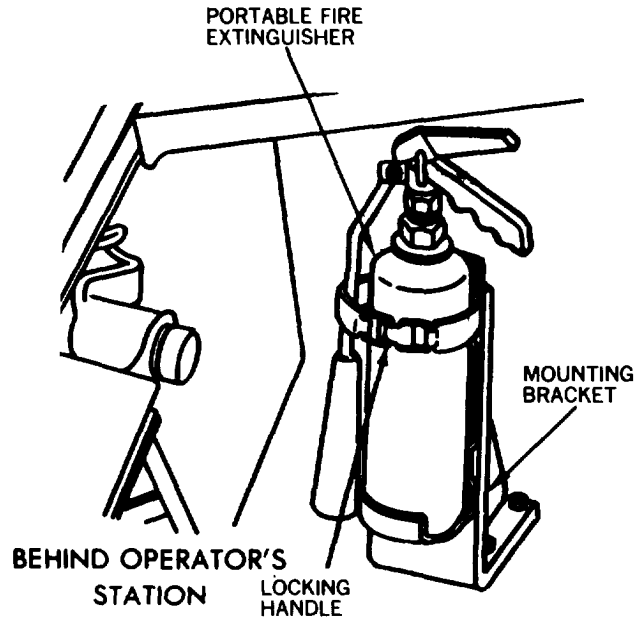
Use only approved seal wire. Do not use safety wire or lock wire. Do not make additional loops/runs for additional strength.

	Install seal wire and lead seals on 1st shot and 2nd shot exterior control handles. **Install three fixed fire extinguishers in vehicle (page 20-52).**	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
			WARNING Handle charged cylinder with care. Do not jar or subject cylinders to temperatures above 140°F (60°C). Accidental discharge could result in injury or death to personnel.	
41	Semiannual	Portable Fire Extinguisher	Remove and weigh portable fire extinguisher. If cylinder charge is low, request exchange (DA Form 2402) or request recharging (DA Form 2407). Check portable fire extinguisher mounting bracket is securely mounted behind operator's seat. Check locking handle for freedom of action.	Extinguisher is missing or seal/hardware is missing or broken.



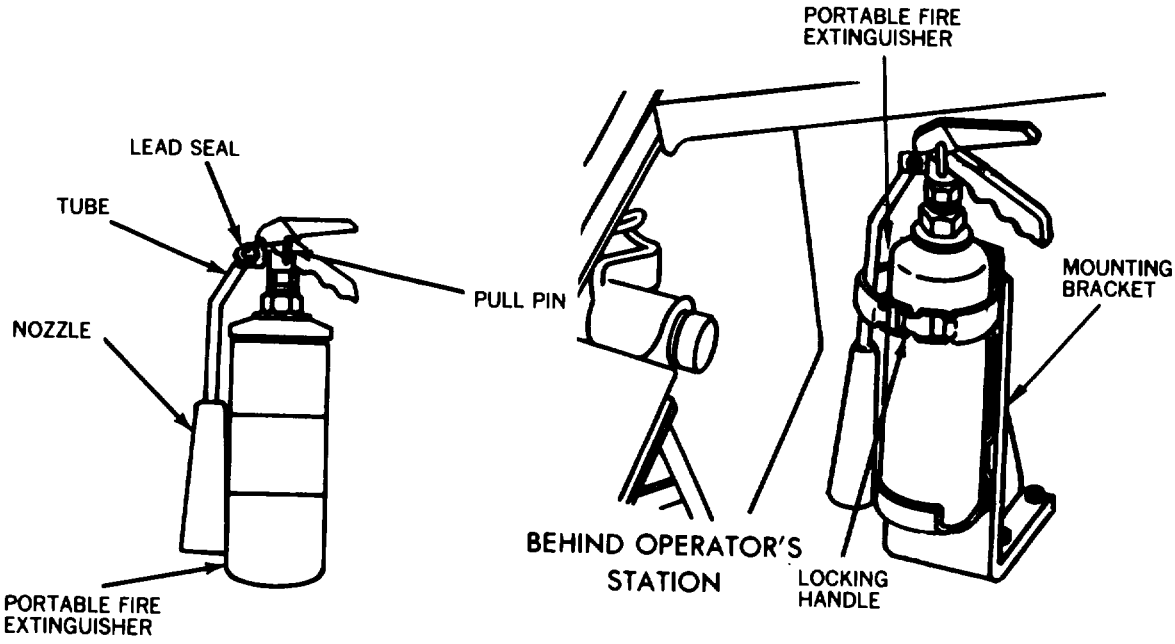
Preventive Maintenance Checks and Services for M60A1 AVLB Hull-Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
41	Semiannual	Portable Fire Extinguisher - Continued	Check that plastic indicator is intact.	

NOTE

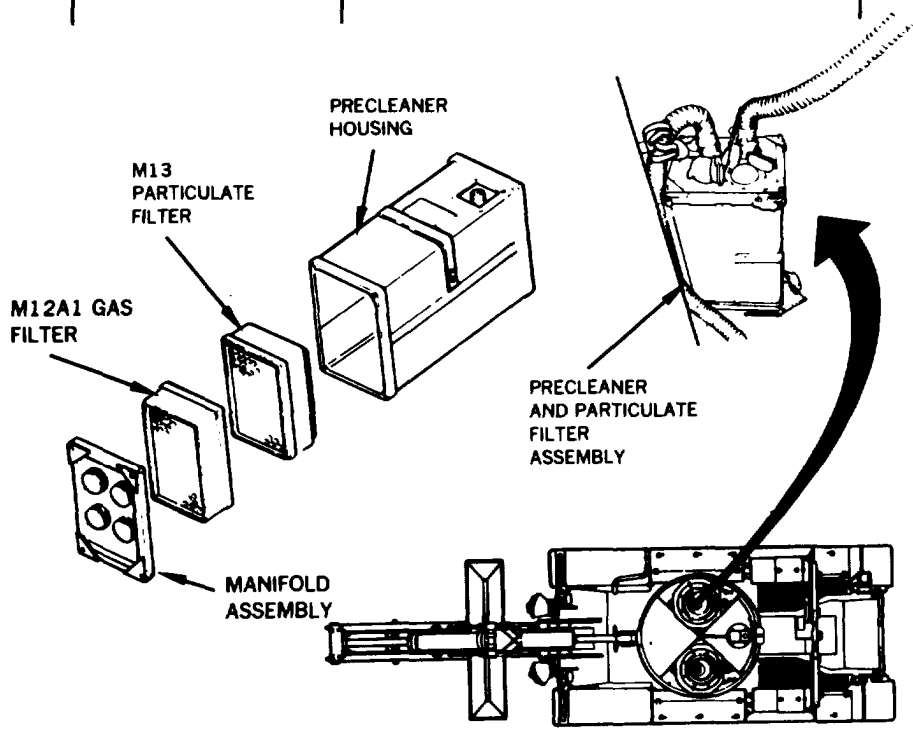
Some fire extinguishers have a safety wire-lead seal attached to pull pin.

	Check that safety wire-lead seal is not broken or missing. Check that tube is not kinked. Check that nozzle is clear of obstructions. Install portable fire extinguisher on mounting bracket. Check that locking handle holds fire extinguisher firmly in position on mounting bracket.	



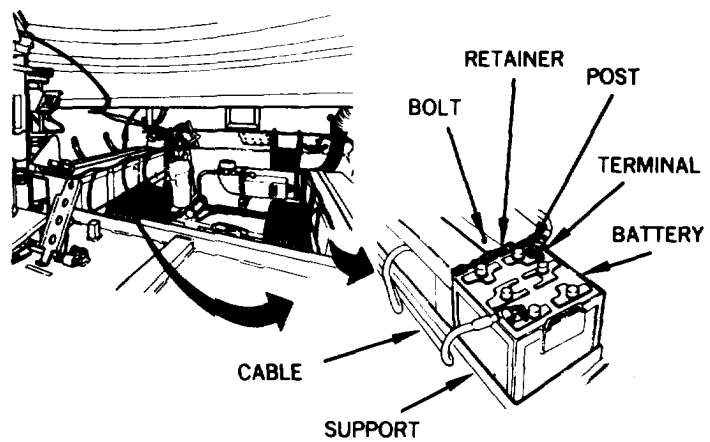
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
			WARNING • If NBC exposure is suspected, all filter media must be handled by personnel wearing protective equipment. Contact your unit NBC Officer or NBC NCO for appropriate handling or disposal procedures. • Gas particulate filters must be replaced at the initiation of combat operations where the use of a blood agent (AC or CK) is expected or after a known blood agent attack.	
42	Semiannual	Gas Particulate Filter System	For air flow testing see (TM 3-6680-316-10). Check precleaner housing, M12A1 gas filter, and M13 particulate filter and particulate filter assembly and two M18 gas particulate filters for dents/damages. Replace defective filters. Replace filters when notified by vehicle operator that gas filter change criteria has been met.	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
			WARNING **Never allow flame or sparks near battery. Battery gas (hydrogen and air) is a dangerous explosive.** **NOTE** maintenance instructions see TM 9-6140-200-14.	
43	Semiannual	Batteries and Battery Retainer	Check if cable terminals, posts, batteries, supports, retainers, bolts, and washers are clean of dirt, excess grease, and corrosion. If dirt, grease, or corrosion are found, remove batteries (page 10-253). Using a stiff brush and solution of water and bicarbonate of soda, clean cables, terminals, posts, batteries, supports, retainers, bolts, and washers. Install batteries if removed (page 10-256). Tighten terminals and retainer hold-down screws carefully to avoid damage to batteries. Apply light coat of grease (Item 37, Appendix D) to terminals. Check battery cover for cracks and damage.	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

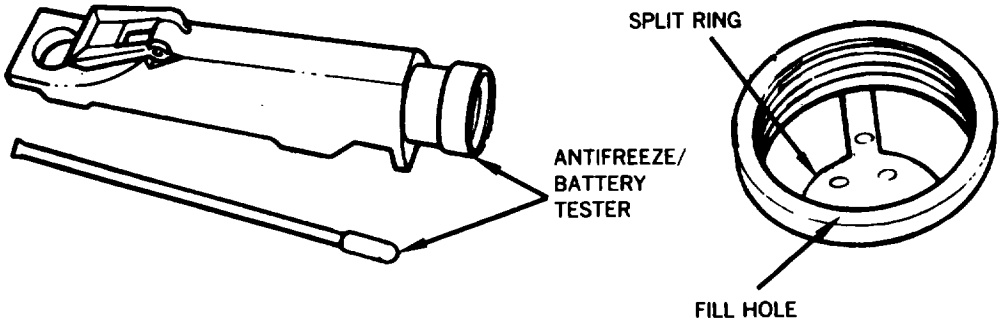
Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
43	Semiannual	Batteries and Battery Retainer - Continued	Remove battery caps. Check that electrolyte covers plates at bottom of fill hole.	

WARNING

Do not fill battery cells from a pressurized water source. Electrolyte and battery corrosion can injure you. Wear safety goggles and gloves. If for any reason electrolyte or battery corrosion contacts the eyes, skin, or clothing, immediately flush with large amounts of fresh water. In case of eye or skin contact, see doctor immediately.

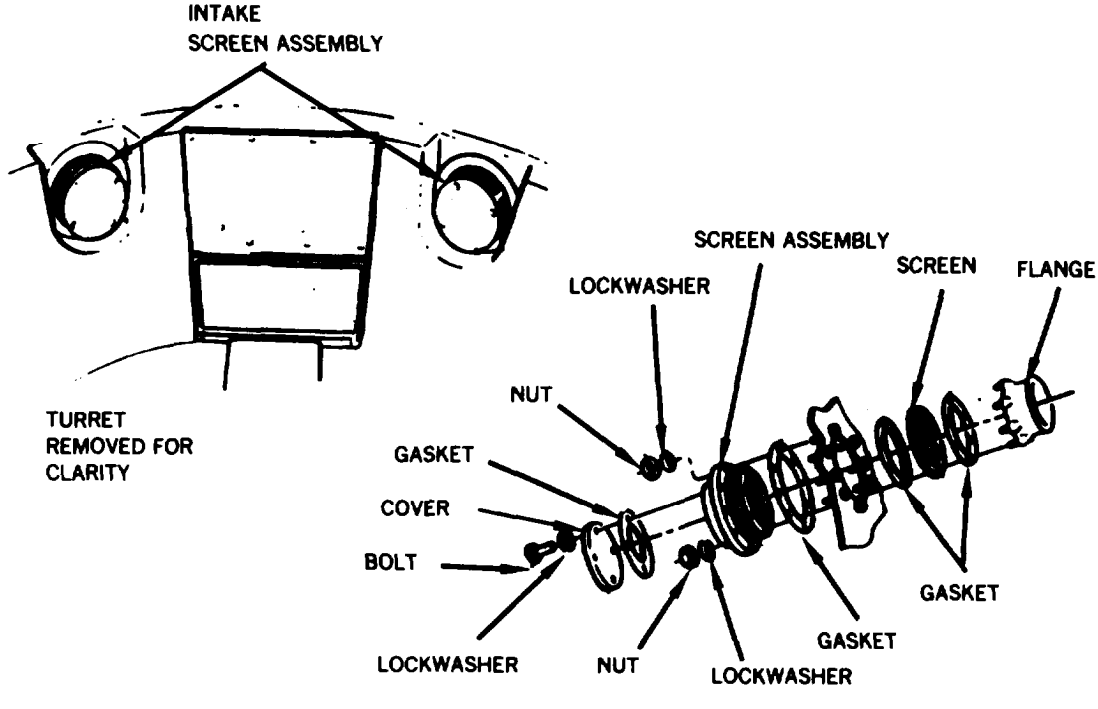
If level is low, add distilled water to fill hole, as required, until level is above plates (if equipped with split ring fill to bottom of split ring). Do not overfill.

If water is added to batteries, install caps, start engine and charge batteries for 15 minutes (TM 5-5420-202-10). Wait 30 minutes for batteries to stabilize, then perform battery testing (page 10-258).



Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
44	Semiannual	Air Intake Screens and Covers (Left and Right Sides)	Remove four bolts and lockwashers. Remove cover and gasket.	
			Remove 14 nuts and lockwashers. Remove intake screen assembly.	
			NOTE • Do not remove flange from air cleaner hose. • Later models (improved clean air system) have only one gasket and no screen.	
			Check gaskets and screens for damage. If damaged, remove gaskets from metal parts and discard gaskets.	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
			WARNING Dry Cleaning Solvent P-D-680 is toxic and flammable. To avoid injury, wear protective goggles and gloves and use in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Do not use near open fire or excessive heat. The flash point for Type I Dry Cleaning Solvent is 100°F (38°C), and for Type II is 140°F (60°C). If you become dizzy while using Dry Cleaning Solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.	
44	Semiannual	Air Intake Screens and Covers (Left and Right Sides) - Continued	Clean cement from metal parts using dry cleaning solvent (Item 55, Appendix D). Cement new gaskets in place using adhesive (Item 2, Appendix D).	

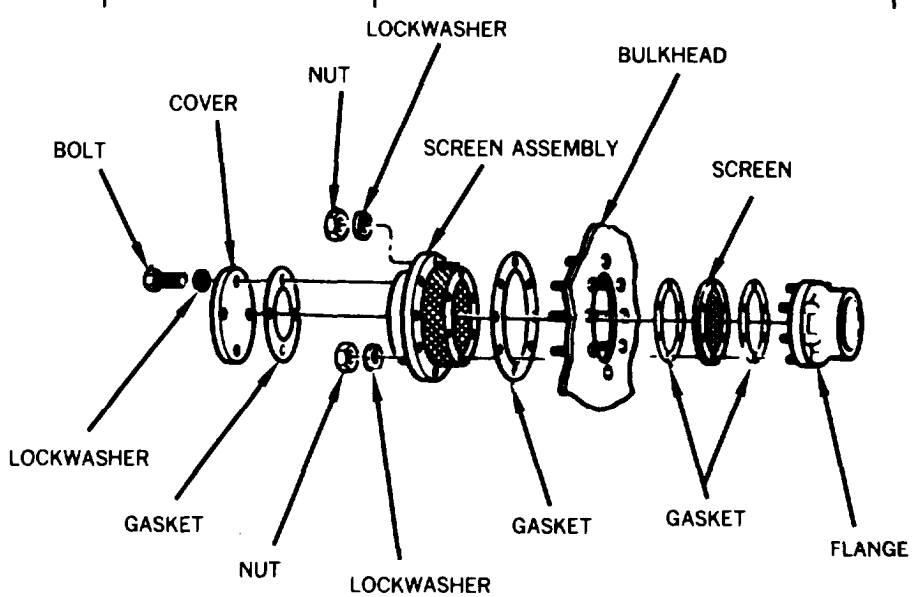
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
44	Semiannual	Air Intake Screens and Covers (Left and Right Sides) - Continued		

NOTE

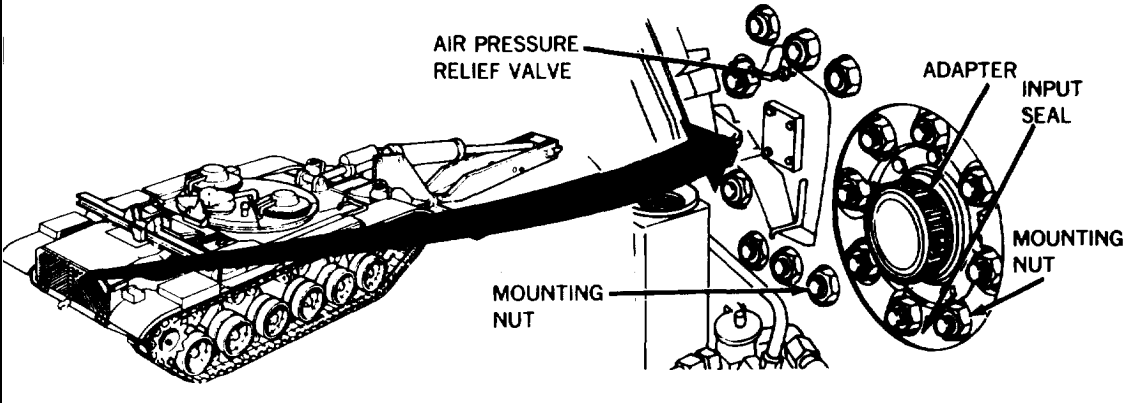
Late models (improved clean air system) have only one gasket and no screen.

	Cement gaskets to flange and screen. Cement gasket to bulkhead and cover. Aline flange studs with holes in intake screen. Position intake screen assembly on bulkhead with holes alined. Install six new lockwashers and nuts on flange studs. Install eight new lockwashers and nuts. Position cover on intake screen assembly with holes alined. Install four new lockwashers and four bolts.	



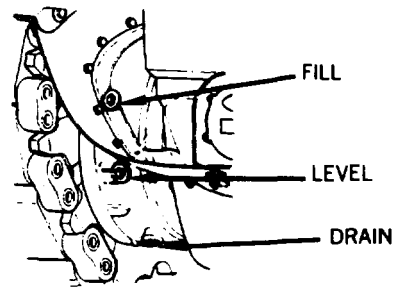
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
45	Semiannual	Engine Compartment	Remove powerplant (page 5-2) and check engine compartment for oil, grease, sand and dirt. Clean engine compartment to remove all oil, grease, sand, and dirt.	
46	Semiannual	Final Drive (Left Right Sides)	Visually check final drive input seal for leaks by inspecting the area below the final drive adapter for evidence of oil. If there are signs of leaks, seal is defective. Use 0-600 lb-ft torque wrench, check that final drive mounting nuts are tightened to at least 460 lb-ft (623 N·m). Do not tighten loose nuts, nuts not meeting torque requirements are to be discarded and replaced. Tighten replaced nuts to 460-500 lb-ft (623-677 N·m). If equipped, replace air pressure relief valve (page 12-6).	Any class III



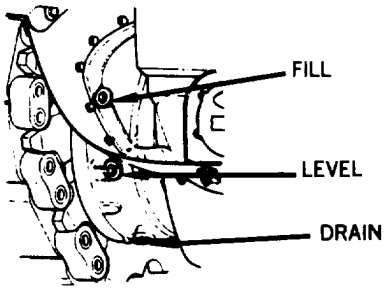
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
46	Semiannual	Final Drive (Left and Right Sides) - Continued	If performing biennial PMCS, go to Item 77 (page 3-111).	
			Check oil level. Check more frequently if there is evidence of leakage. Check before operating vehicle when oil is cold.	
			To check oil level remove level plug. If oil has been overfilled, allow excess oil to drain into a suitable container. It is normal for a small quantity of oil (approximately 2 or 3 tablespoons), trapped behind plug, to run out when plug is removed.	
			Check level (magnetic) plug and oil for metal content.	Any large metal chips or shavings.
			Check that oil level is up to lower edge of level plug hole. Carefully insert finger into plug hole and feel for oil. If oil level is up, clean and install level plug.	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
46	Semiannual	Final Drive (Left and Right Sides) - Continued	If oil level is low, install level plug, remove fill plug, and add oil. Check oil level at level plug. Repeat procedure as necessary until proper level is reached. Do not overfill. Clean and install fill and level plugs. When temperatures are constantly below +10°F (-12°C) for 7 days or more, change oil to OEA (MIL-L-46167).	



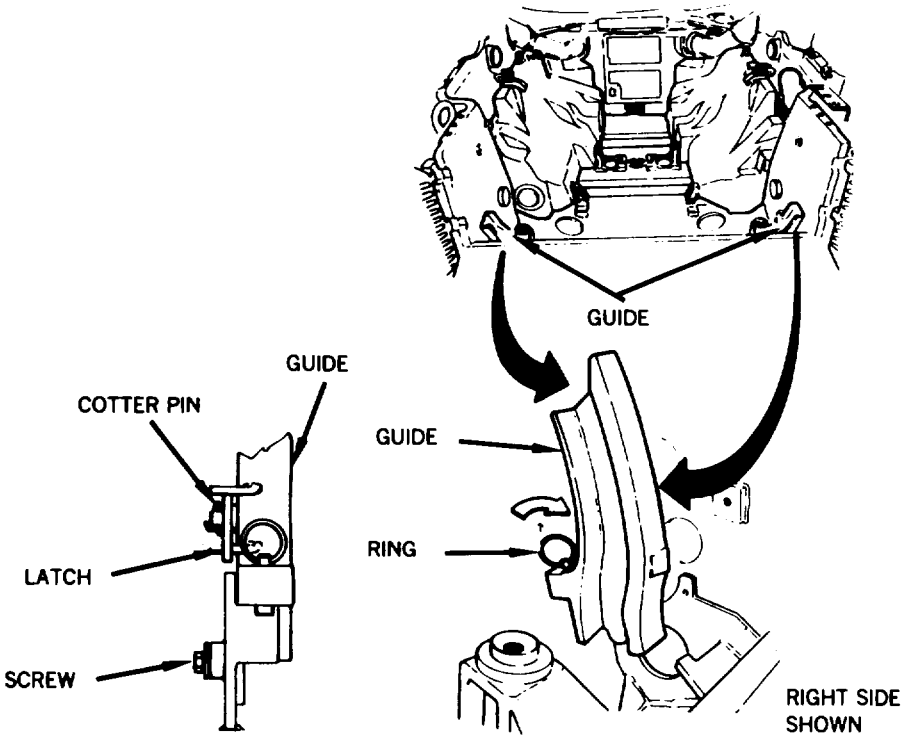
Final Drive Lubricant

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Final Drive +5°F to +125°F (-15°C to +52°C)	OE/HDO-15/40 (O-1236) MIL-L-2104	AR	S	0.5
+5°F to -70°F (-15°C to -57°C)	OEA (O-183) MIL-L-46167			

For arctic operation, see FM 9-207

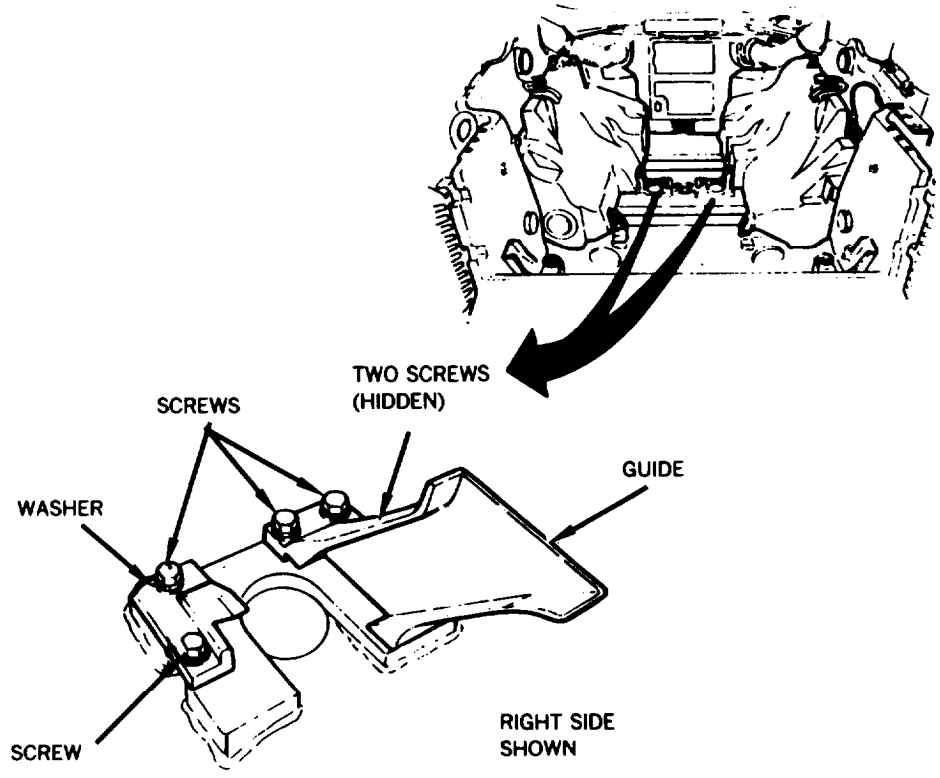
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
47	Semiannual	Powerplant Mounting Guides (Front and Rear)	Check rear guides for cracks and wear. Enter engine compartment. Pull up on ring. While holding ring up, move guide back and forth. Guide should move freely. Release ring. Ring should return to its original position. If ring does not return, spring (hidden) is defective. Check back of guide. Check that screw cannot be turned by hand. Check that cotter pin is not broken or missing. Lift latch up. Latch should move freely.	Any cracked or broken mounts.



Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
47	Semiannual	Powerplant Mounting Guides (Front and Rear) - Continued	Check front guides for cracks and wear. Check both guides for broken or missing washers and screws.	Any cracked or broken mounts.
			NOTE Three screws on right guide are inaccessable and cannot be tightened. Center screw on left guide is inaccessable and cannot be tightened.	
			Check that screws are tightened to at least 155 lb-ft (210 N·m).	



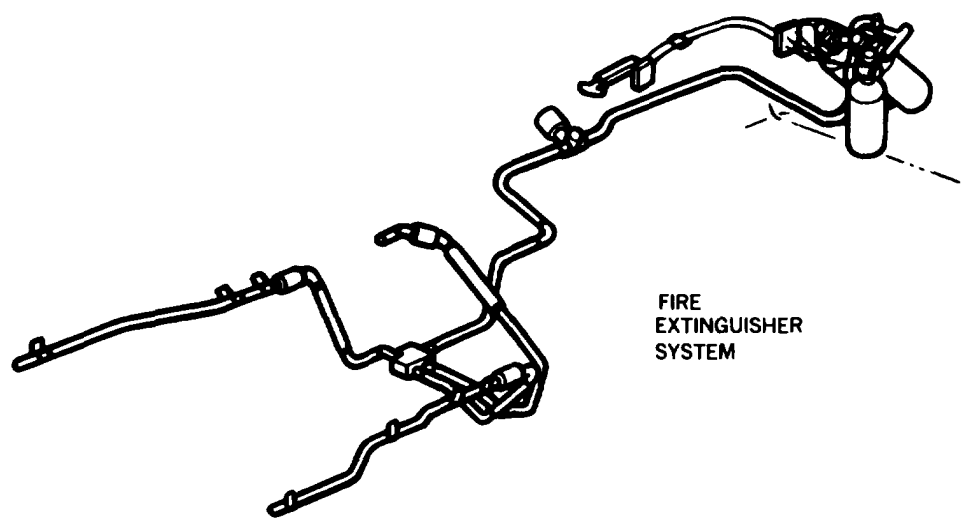
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
48	Semiannual	Fixed Fire Extinguisher System	Step 1	

NOTE

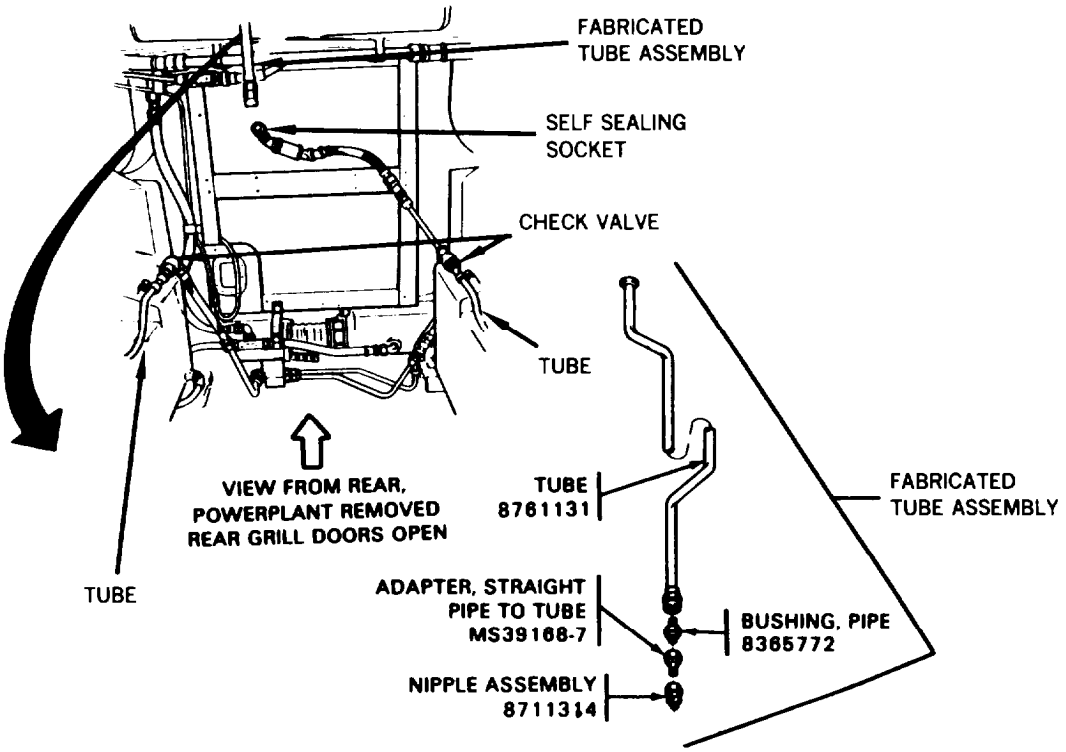
One person is required to perform steps 1 through 4, 12 and 13. Three persons are required to perform steps 5 through 11.

	Remove floor plate panels as required to inspect fire extinguisher system lines and fittings mounted to hull floor and walls. Inspect fire extinguisher system lines and fittings on floor and walls of hull. Check for looseness of lines and fittings. Check for cracked, dented, or broken lines. Tighten loose fittings.	



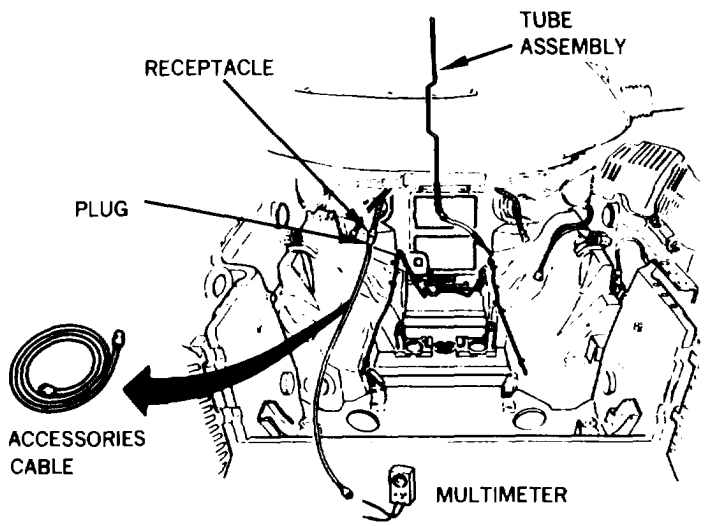
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
48	Semiannual	Fixed Fire Extinguisher System - Continued	Step 2 Check that 18 spray holes, located in tubes are clear. Check that drain holes located at bottom of each tube adjacent to check valves are clear. Check tubes for punctures, damage, or dents larger than 1/16 inch (0.16 cm). Step 3 Attach fabricated tube assembly to engine quick disconnect upper discharge self-sealing socket.	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
48	Semiannual	Fixed Fire Extinguisher System - Continued	Position tube assembly in an upright position and secure to launcher quadrant with webbing strap. Do not obstruct spray holes in tube assembly with webbing strap or handrail. Step 4 Connect plug of powerplant test run accessories cable (Item 31, Chapter 3, Section I) to receptacle of engine accessories harness at left side hull-engine disconnect.	



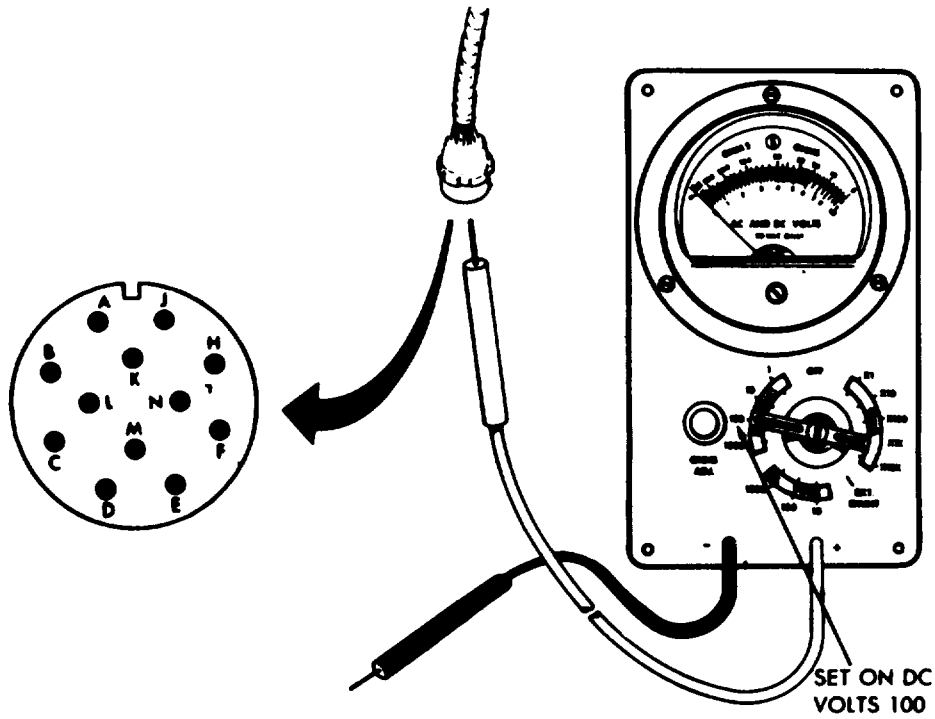
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
48	Semiannual	Fixed Fire Extinguisher System - Continued		

NOTE

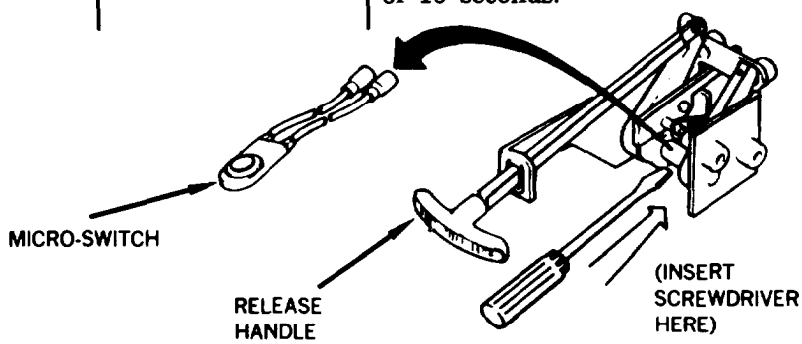
Negative battery terminals must be connected for this procedure.

	Set multimeter to 100 volts DC scale. Connect red probe of multimeter to pin B of accessory cable. Connect black probe of multimeter to vehicle ground.	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
48	Semiannual	Fixed Fire Extinguisher System - Continued	Station person No. 1 in driver's station, person No. 2 in commander's station, and person No. 3 at rear of vehicle just outside of engine compartment. Step 5 Person No. 1 set MASTER BATTERY switch to ON. Operate (and hold momentarily) ENGINE FUEL SHUT OFF switch. Person No. 3 check that multimeter reads 18-30 volts dc. Person No. 1 set MASTER BATTERY switch to OFF. **NOTE** Do not pull inside fire extinguisher release handle. Person No. 1, insert 6-inch flat tip screwdriver from front side between fuel shutoff switch guard and release cam. Depress (and immediately release) micro-switch located in handle release mechanism. Step 6 Person No. 3 check that multimeter reads 18-30 volts dc for a minimum of 10 seconds.	

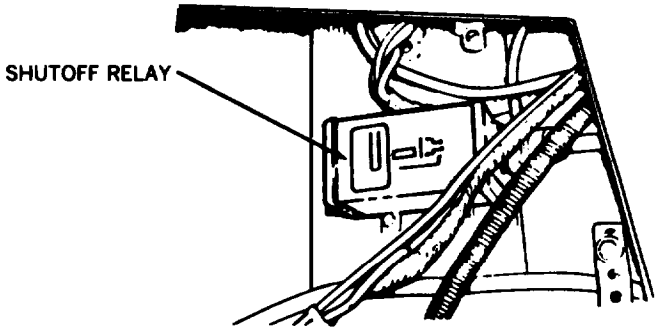


Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
48	Semiannual	Fixed Fire **Extinguisher System - Continued**	If multimeter indicates 18 to 30 volts dc for less than 10 seconds in duration, fire extinguisher fuel shutoff relay is defective. If no voltage is observed, troubleshoot fire extinguisher fuel shutoff switch circuitry (page 4-572).	

NOTE

Do not disconnect multimeter (multimeter is needed for step 9).



	Step 7

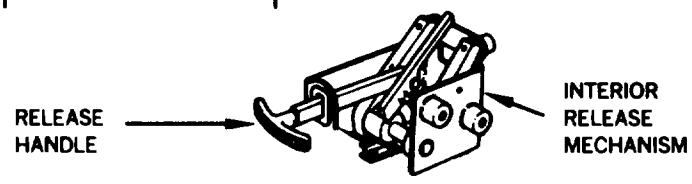
WARNING

Relieve system of high pressure (800-1800 psi) gas slowly. Gloves and eye protection must be worn. Avoid breathing vapors. Failure to comply may result in injury or death to personnel.

NOTE

- **All personnel must be completely familiar with steps 7 through 11 before proceeding. Steps must be performed within duration of cylinders discharge (approximately 9 to 15 seconds).**
- **Complete steps 7 through 11 before attempting repair or retest.**

	Person No. 1 pull inside release handle, announce firing and push handle back in.



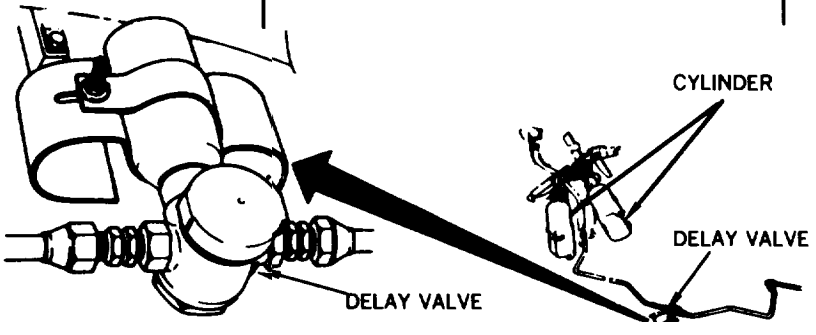
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
48	Semiannual	Fixed Fire Extinguisher System - Continued		

NOTE

Leaks can be located by checking for frost on system lines immediately after system is fired. If check is not completed immediately, all lines normally will frost within 20-30 seconds and cover frost formed due to leaks.

	Person No. 1 and 2, immediately after handle has been pulled and before delay valve releases charge (when vapor is seen at engine extinguisher tubes), check system from cylinders to delay valve for sound of leaks, visible vapor, or frosting around leak. If vapor does not appear from engine compartment within 10 seconds after handle is pulled, proceed to step 13. If vapor is seen from only one line in engine compartment, proceed to step 12. Person number 2 also check the time interval from firing announcement to exit of vapor from engine spray tubes is from 6 to 10 seconds. If time interval is less than 6 seconds or more than 10 seconds, replace defective delay valve (page 20-56).	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
48	Semiannual	Fixed Fire Extinguisher System - Continued	Step 8 Person No. 2 check downstream of delay valve for sound of leaks, visible vapor, and frosting around leak. Step 9 As firing of extinguisher is announced, person No. 3 check that multimeter immediately shows 18-30 volts.	

WARNING

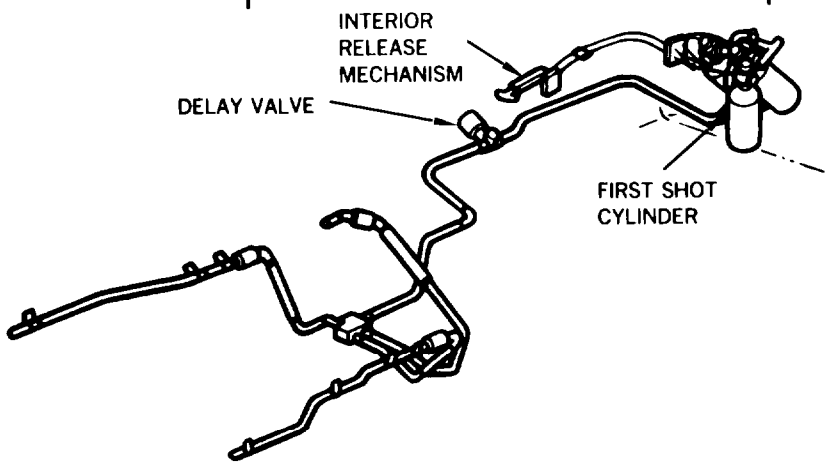
Handle charged cylinders with care. Do not jar or expose cylinders to temperatures above 140°F (60°C). Accidental discharge could result in injury or death to personnel.

NOTE

Observation of the CO_2 discharge should be performed when little or no wind is present. Start timing when CO_2 cloud spray is first seen. Stop timing when CO_2 cloud starts to shrink.

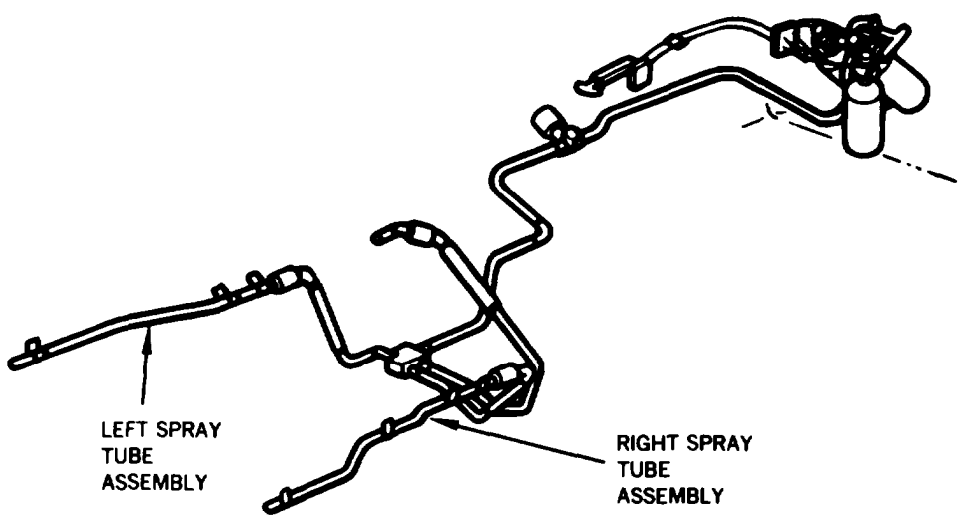
Step 10

Person No. 3 check that time of visible duration of CO_2 cloud/spray is no more than 8 seconds.



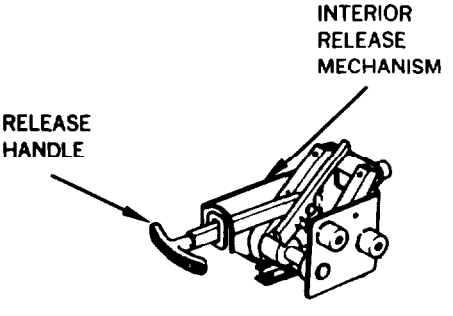
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

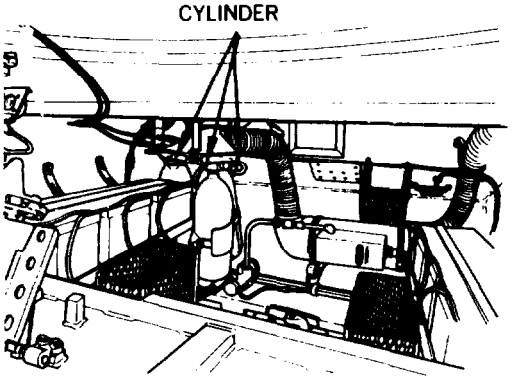
Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
48	Semiannual	Fixed Fire Extinguisher System - Continued	Start timing when CO_2 cloud/spray is first seen. Stop timing when CO_2 cloud/spray starts to shrink. Check that CO_2 cloud/spray in hull area is continuous and uniform with no voids in upper and lower rows of spray holes in left and right spray tubes. If cloud spray is not continuous and uniform, check for punctures, leaks, and clogging. Correct defects before continuing with preventive maintenance checks. Check that CO_2 cloud/spray from left and right tubes are of equal size. If either cloud/spray is 1/3 size of other, check for restricted tubes and valves.	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
48	Semiannual	Fixed Fire Extinguisher System - Continued	Immediately after timing cloud/spray person No. 3 check that tube assembly and both hull extinguisher lines are frosted their full length. All lines should be frosted their full length. If any line is only partially frosted, check for clogging in spray line. If not frosted at all, check for faulty check valve or clogged supply line. If duration of spray cloud is more than 8 seconds, immediately check to see if No. 2 and 3 cylinders are frosted. If cylinders are frosted (discharging), interior release handle mechanism is defective. Replace release handle mechanism (page 20-23).	





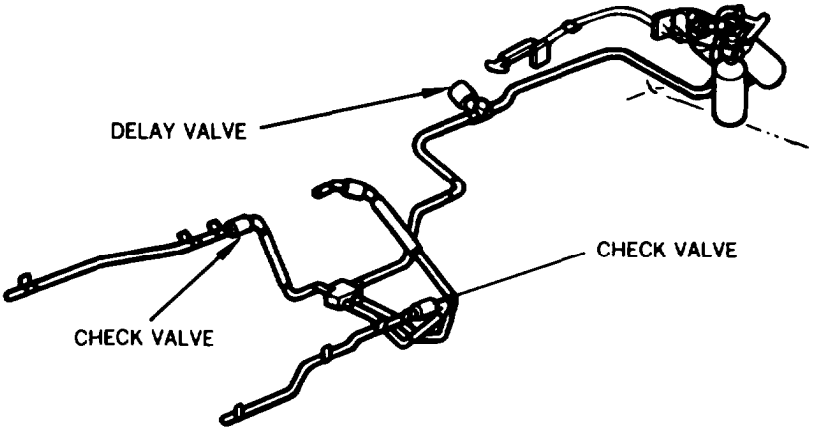
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
48	Semiannual	Fixed Fire Extinguisher System - Continued	Clocked time for CO_2 cloud duration is valid only when all other checks (non-electrical) are acceptable. If all checks are met except cloud duration time, No. 1 cylinder was defective. If any defects are found, correct defects, and retest. If no defects are found, continue with step 12. Step 11 If retest is needed, reset control handle by positioning pawl into slot, reset No. 1 control valve, and replace cylinder No. 1. Repeat steps 7 through 10 to retest cloud/spray duration time.	

NOTE

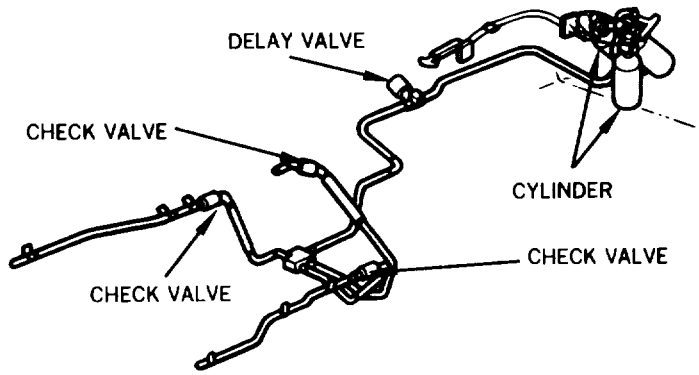
If delay valve is still open (from having fired No. 1 shot), there will be no (6 to 10 second) delay of CO_2 when a subsequent shot is fired. Opened delay valve may take 2 to 4 hours to thermally reseat before it can delay another CO_2 shot. (Resetting is not necessary to time cloud duration.)

			Step 12 If only one hull spray line discharges, check valve on other line and check for clogged or pinched lines.	



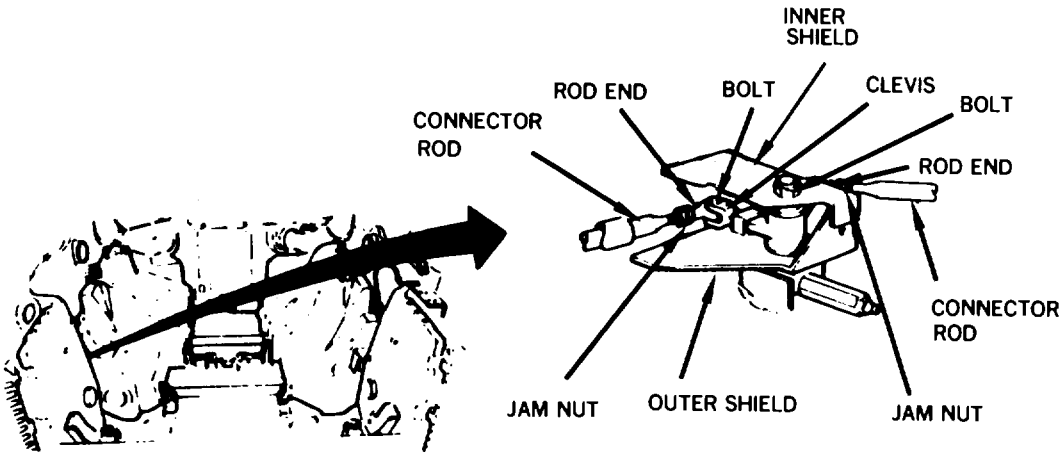
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
48	Semiannual	Fixed Fire Extinguisher System - Continued	Step 13 If there is no CO_2 discharge whatsoever, check for trapped high pressure gas.	
			WARNING Relieve system of high (800-1800 psi) pressure gas slowly. Wear gloves and eye protection. Avoid breathing vapor. Failure to comply may result in injury or death to personnel.	
			Loosen any fitting between delay valve and check valve. If trapped gas escapes, replace all three check valves and repeat step 7. If no gas escapes, tighten fitting. Loosen any fitting between the CO_2 cylinder and delay valve. If gas escapes, replace discharge delay bottle assembly (page 20-56). Remove No. 1 CO_2 cylinder (page 20-52). Tag cylinder and send to support maintenance for recharging. Reset control handle and reset control valve. Replace No. 1 CO_2 cylinder (page 20-52). Repeat steps 7 through 11. Remove multimeter from accessory test cable. Remove accessory test cable from engine accessory control harness. Reset control handle, reset control valve and replace No. 1 CO_2 cylinder.	**Fixed fire extinguisher system does not operate properly.**



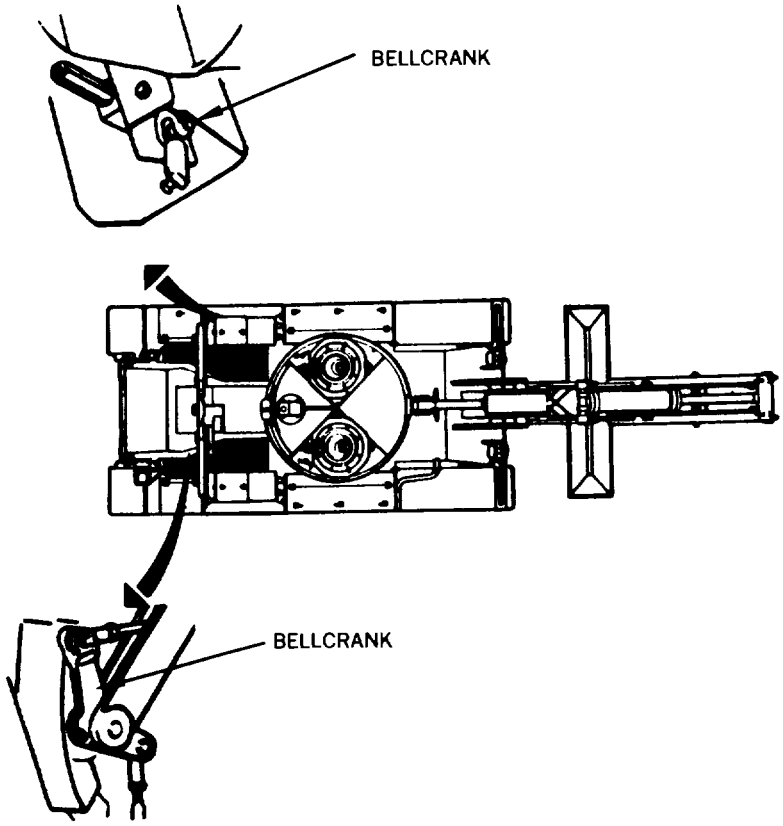
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
49	Semiannual	Steering Control Linkage	Check steering control linkage, inner and outer shields, clevis, connector rods, and rod ends for looseness, damage, and corrosion. Check that bolts and jam nuts are secure.	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
49	Semiannual	Steering Control Linkage - Continued	Lubricate steering bellcranks.	



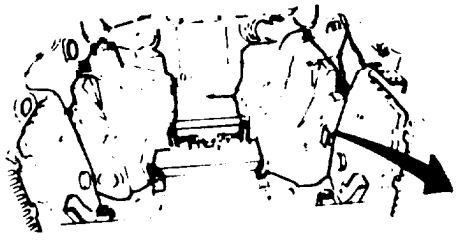
Steering Bellcranks Lubricant

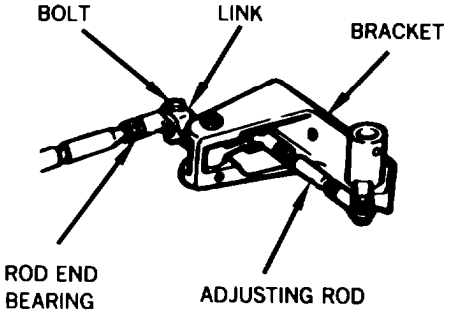
Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Steering Bellcranks All Temperatures	WTR (G-395) MIL-G-81322	AR	S	0.3

For arctic operation, see FM 9-207

Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

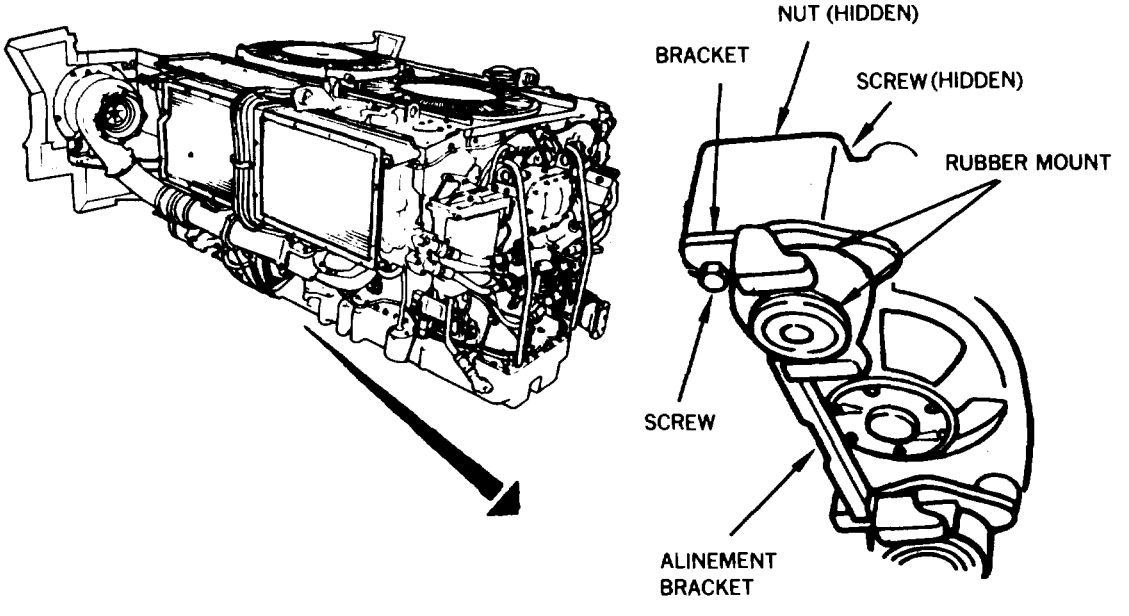
Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
50	Semiannual	Shifting Control Linkage	Check shifting control linkage bracket, link, adjusting rod, and rod end bearing for looseness, damage, and corrosion. Check that bolt is secure.	





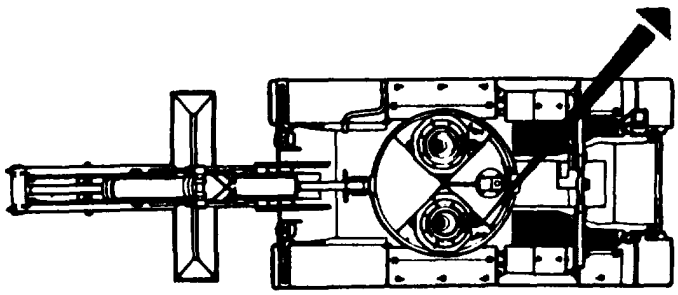
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

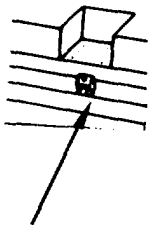
Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
51	Semiannual	Engine Mounts (Left and Right Sides)	Check for broken, bent, or damaged mount bracket. Check for loose, missing, or broken screws and nuts.	Broken or damaged mounts.
			NOTE Use torque wrench from the underside of the mount. Position mirror under torque wrench to observe torque reading.	
			Using 0-600 lb-ft torque wrench, check that screws and nuts are tightened to at least 450 lb-ft (610 N·m). Check for cracks and damage to rubber mount. Check for bent or broken alinement bracket.	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
52	Semiannual	Drain Valve Control Rod Housing	Lubricate drain valve control rod housing.	





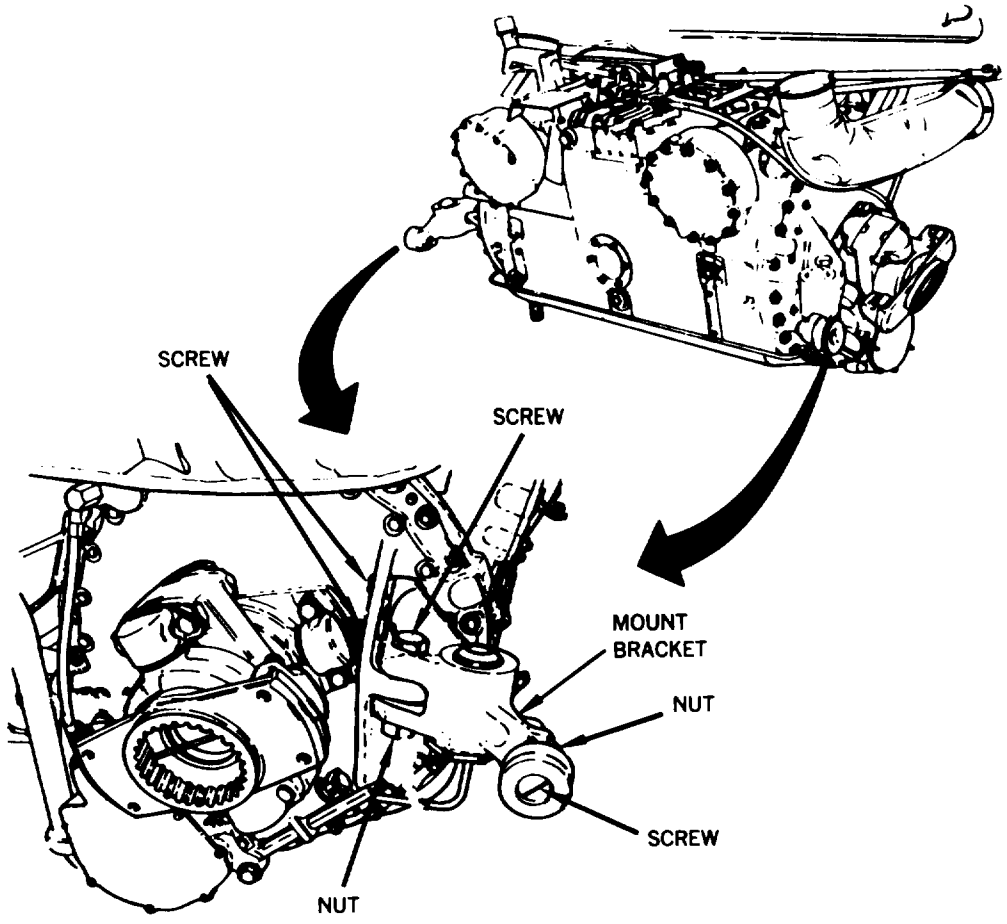
Drain Valve Control Rod Housing Lubricant

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Drain Valve Control Rod Housing All Temperatures	WTR (G-395) MIL-G-81322	AR	S	0.3

For arctic operation, see FM 9-207

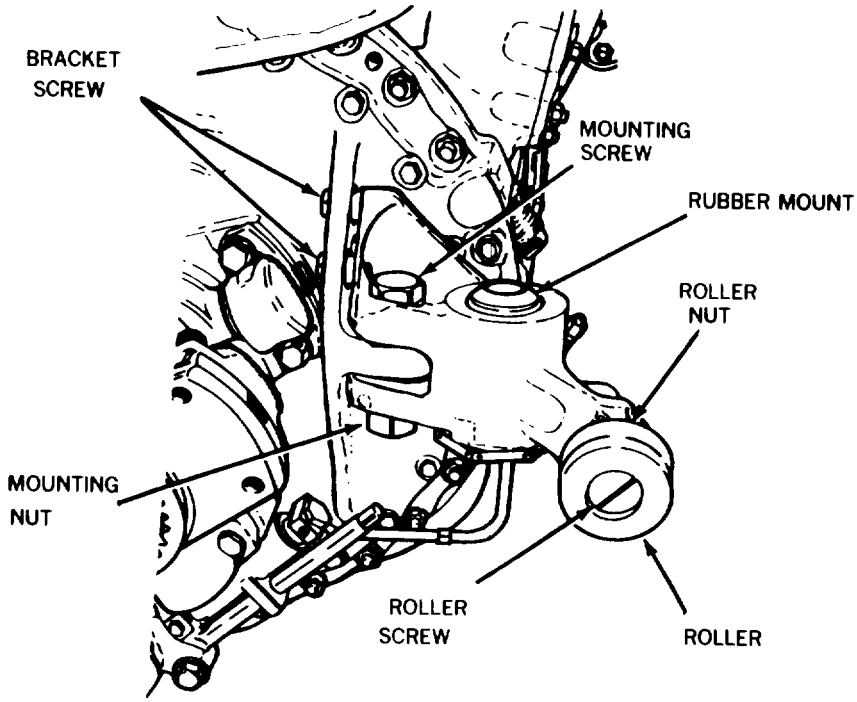
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
53	Semiannual	Transmission Mounts (Left and Right Sides)	Check for broken, bent, or damaged mount bracket. Check for loose, missing, or broken nuts and screws.	Broken or damaged mount.



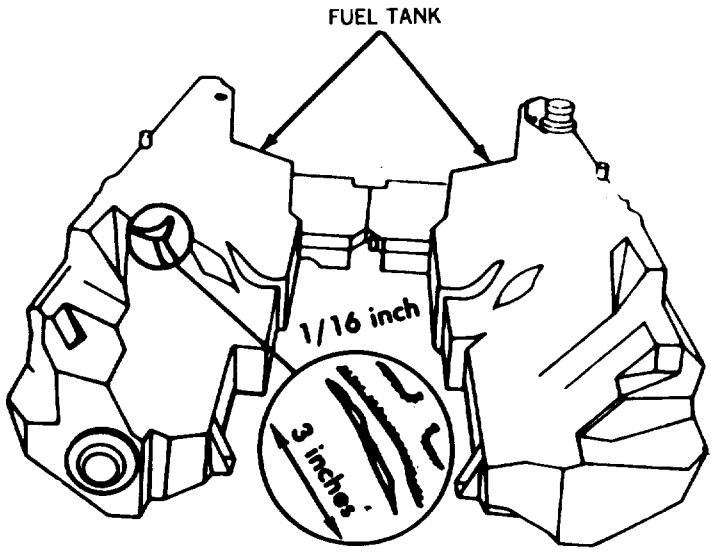
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
53	Semiannual	Transmission Mounts (Left and Right Sides) - Continued	Check that rubber mount is not torn or cracked. Check roller for freedom of movement. Check that bracket screws are tightened to at least 70 lb-ft (95 N·m). Check that mounting screw and mounting nut are tightened to at least 380 lb-ft (515 N·m). Check that roller nut is not backed off roller screw.	



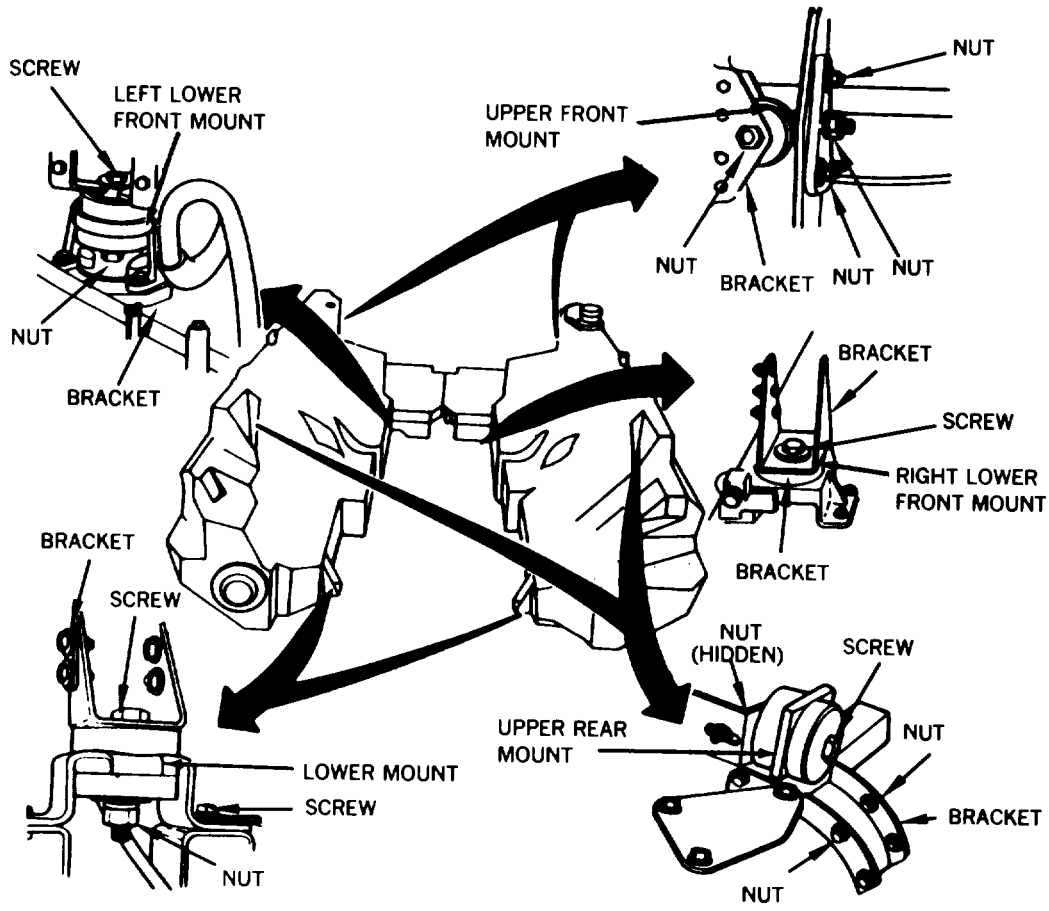
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
54	Semiannual	Fuel Tanks (Left and Right Sides)	Check fuel tanks for cracks. If cracks are less than 3 inches (7.62 cm) long and 1/16 inch (0.16 cm) wide, repair cracks (page 7-331). [f cracks are larger, notify support maintenance. Check engine compartment floor for diesel fuel leaking from back of fuel If any fuel is found, report to support maintenance.	Any class III fuel leak.



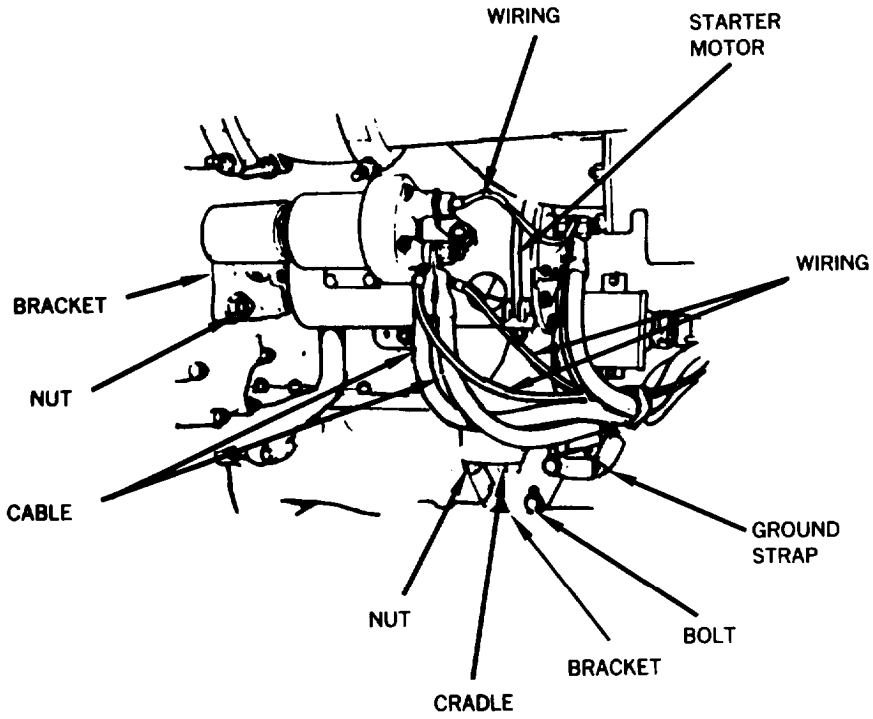
Preventiv Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
55	Semiannual	Fuel Tank Mounts and Brackets	Check rubber bumpers on upper front mounts, left lower front mount, right lower front mount, upper rear, and lower mounts for deterioration, cracks, and cuts. Check brackets for looseness, cracks, and other damage. Check that nuts, screws, and bolts are not loose. Notify direct support maintenance of any damaged rubber mounts or brackets.	Any loose or damaged brackets.



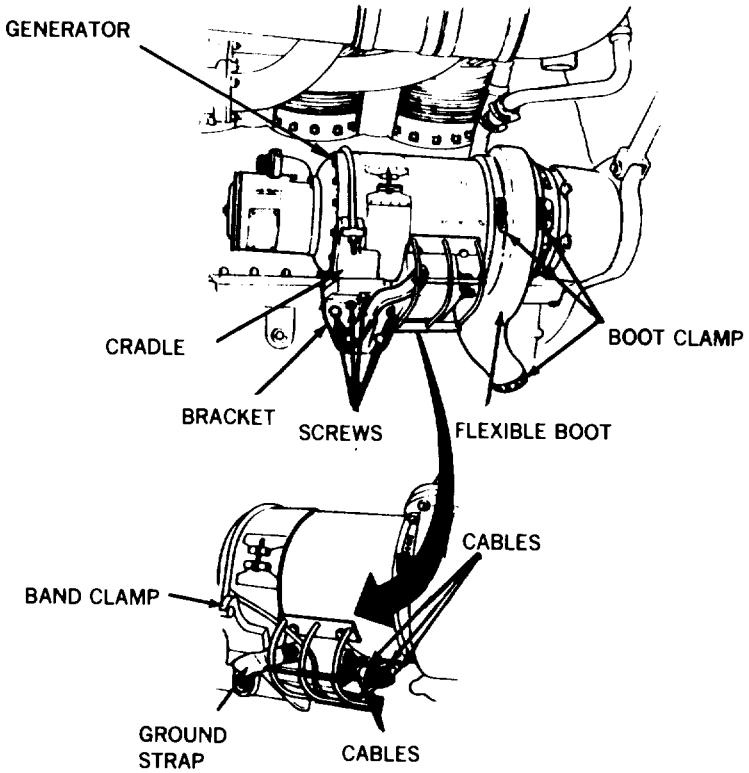
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
56	Semiannual	Starter Motor	Check starter motor for bent, cracked, or damaged brackets, and cradle.	Damaged or bent brackets or cradle.
			Check for loose, missing, or damaged nuts and bolts.	
			Check for missing or broken lockwire at bolts.	
			Check starter for frayed wiring or cables.	Frayed wiring or cables.
			Check that cables, wiring, and ground strap are securely connected.	



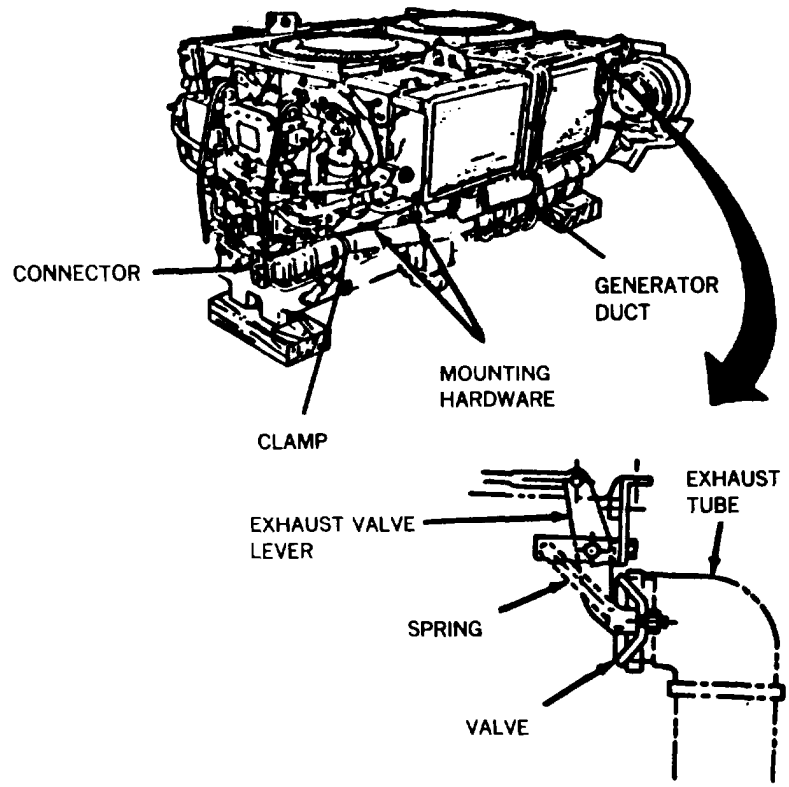
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
57	Semiannual	Generator	Check generator for bent or damaged bracket and cradle.	Damaged or bent brackets or cradle.
			Check for loose, missing, or damaged screws.	
			Check for damaged or cracked flexible boot.	
			Check for frayed cables. Check for secure connections of ground strap and cables.	Frayed wiring or cables.
			Check that cable connections and ground strap connections are free of corrosion.	
			Check that cable band clamp and flexible boot clamps are not loose.	



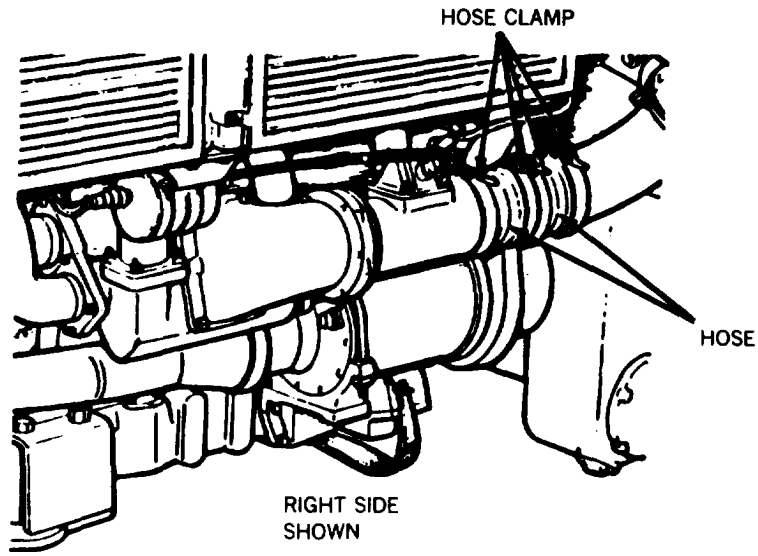
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
58	Semiannual	Generator Duct	Check flexible connector for cracks and tears. Check that clamp is not loose or missing. Check that generator duct mounting hardware is not loose or missing. Check the generator duct for cracks. Check that springs are not missing or broken. Manually pull and hold generator exhaust valve lever. Check that valve is firmly seated on exhaust tube. Release generator exhaust valve lever.	



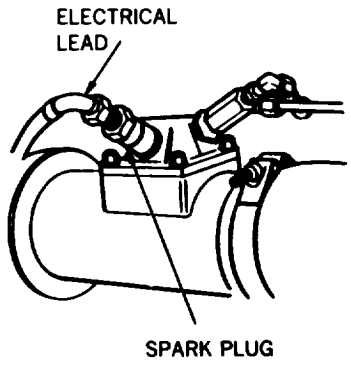
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

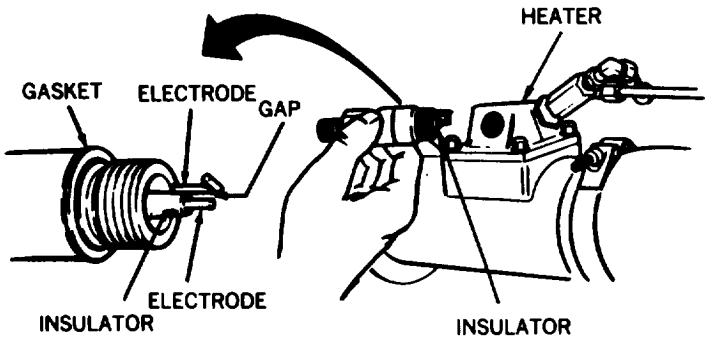
Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
59	Semiannual	Water separator Outer Filter Elements	Service and replace water separator outer filter elements and final filter (center) element (page 7-196).	
60	Semiannual	Water separator Drain Sensor and Solenoid Valve	Perform operational check on water separator, drain sensor, and solenoid valve (page 7-208).	System does not operate.
61	Semiannual	Primary Fuel Filter and Housing	Replace primary fuel filter element and clean housing, 2DA engine (7-192).	
62	Semiannual	Manifold Heaters Fuel Filters	Service and inspect manifold heater fuel filter (page 7-245).	
63	Semiannual	Manifold Heater Spray Nozzles (Left and Right)	Service and inspect manifold heater spray nozzles (page 7-273).	
64	Semiannual	Manifold Hoses and Clamps (right and left)	Check that intake manifold hose clamps are tightened to 30-40 lb-in (3-5 N·m). Check hoses for cracks and damages.	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

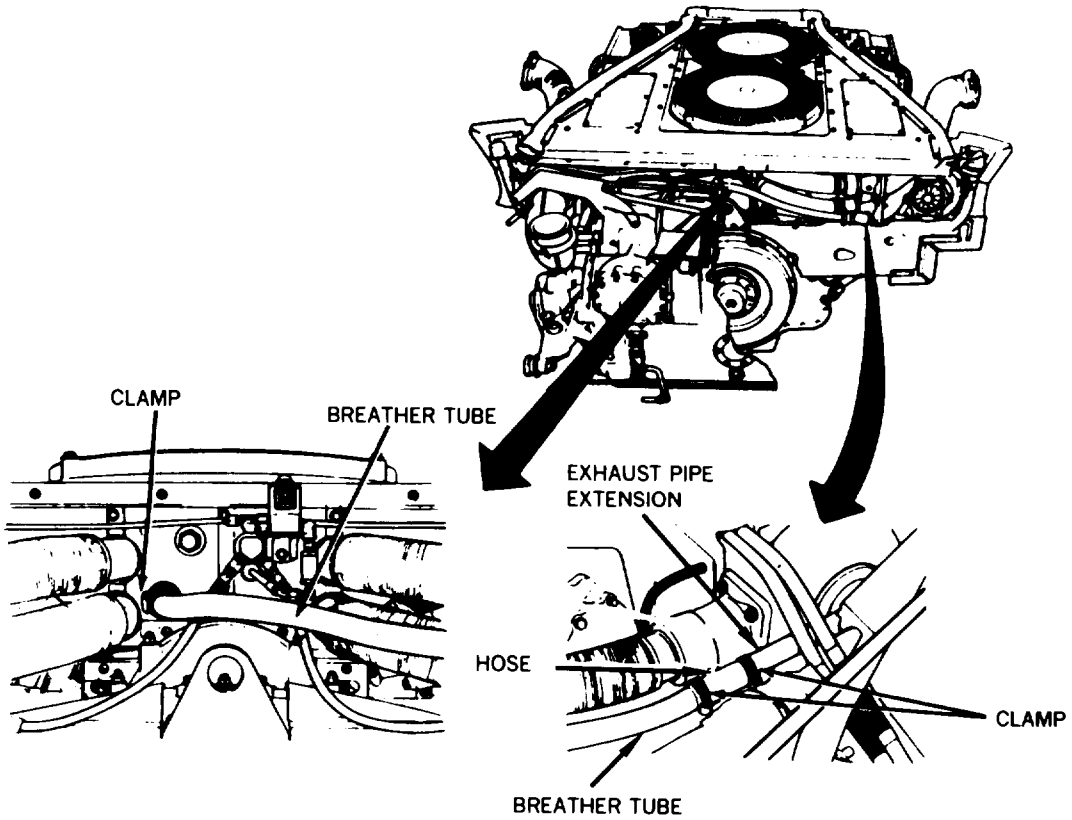
Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
65	Semiannual	Manifold Heater Spark Plugs (Left and Right)	To check and service manifold heater spark plug, disconnect electrical lead from manifold heater spark plug. Unscrew spark plug and remove plug and gasket from heater. Wipe off grease and dirt from electrode and insulator. Check electrodes for pitting and carbon buildup. Clean spark plug and check insulator for cracks. Set spark plug gap to 0.094 to 0.114 inch (0.24 to 0.29 cm). Install spark plug and gasket in manifold heater. Connect electrical lead to spark plug.	





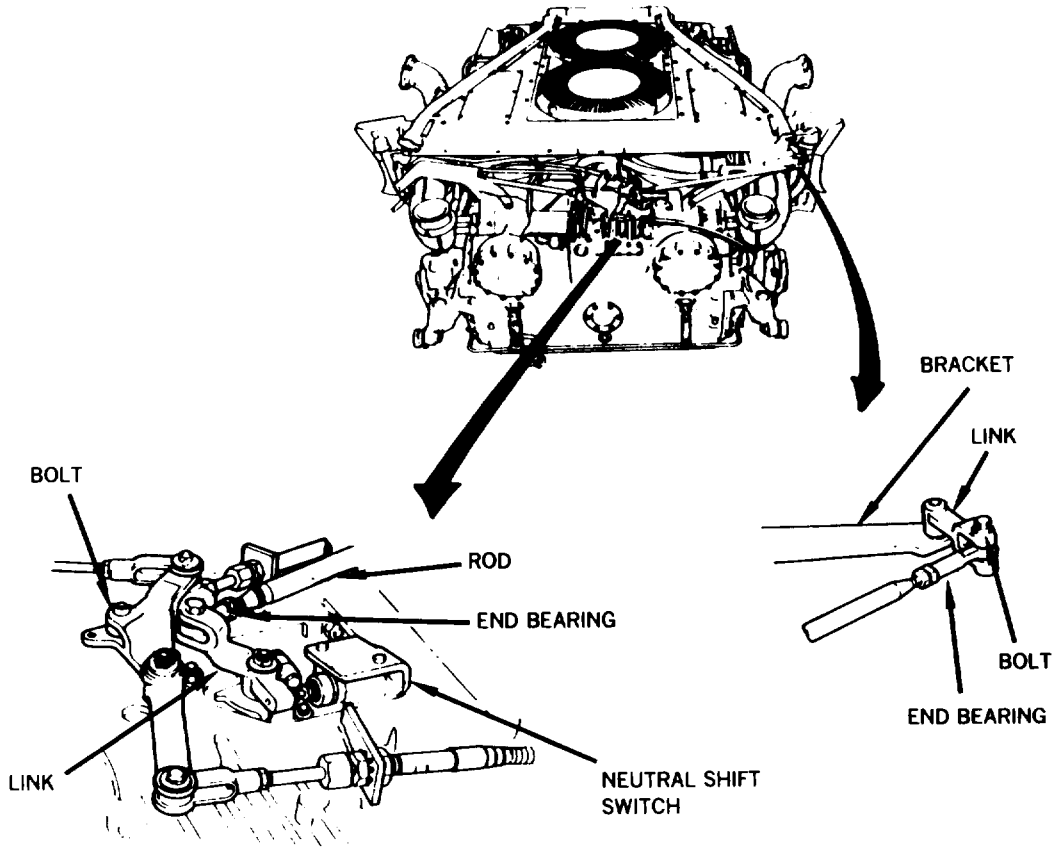
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
66	Semiannual	Crankcase Breather Tube	Remove two hose clamps. Loosen breather tube clamp. Remove hose from breather tube and exhaust pipe extension. Insert rod into exhaust pipe extension to remove carbon buildup. Install two hose clamps on hose. Install hose between breather tube and exhaust pipe extension and secure with two clamps.	



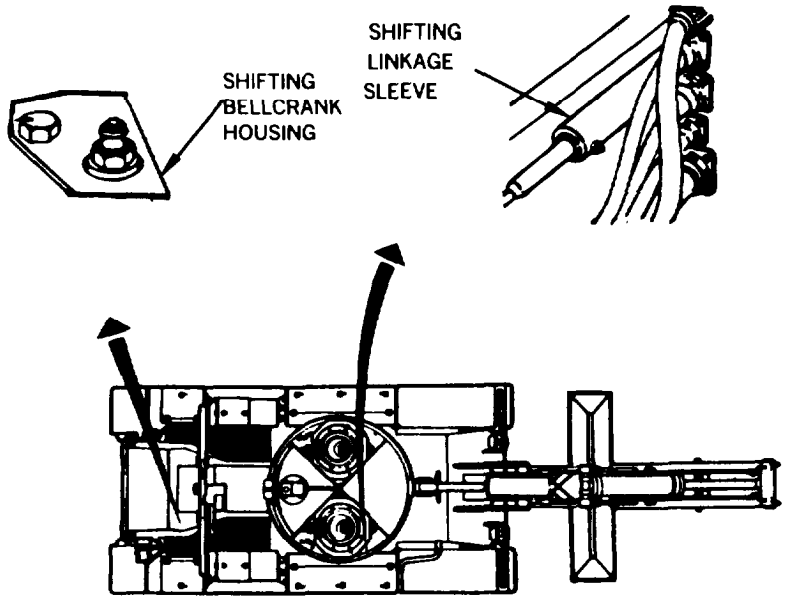
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
67	Semiannual	Transmission	Clean and service main oil filters (page 11-89).	
68	Semiannual	Shifting Control Linkage	Check rod end bearing, link, and bolt, located on top of transmission, for looseness, damage, or corrosion. Check neutral shift switch, for loose bolts and loose or damaged wiring. Check end bearing, link, bracket, and bolt for looseness, damage, or corrosion.	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
69	Semiannual	Shifting Control Linkage - Continued	Lubricate shifting bellcrank housing located at rear of right fuel tank. Lubricate shifting linkage sleeve.	



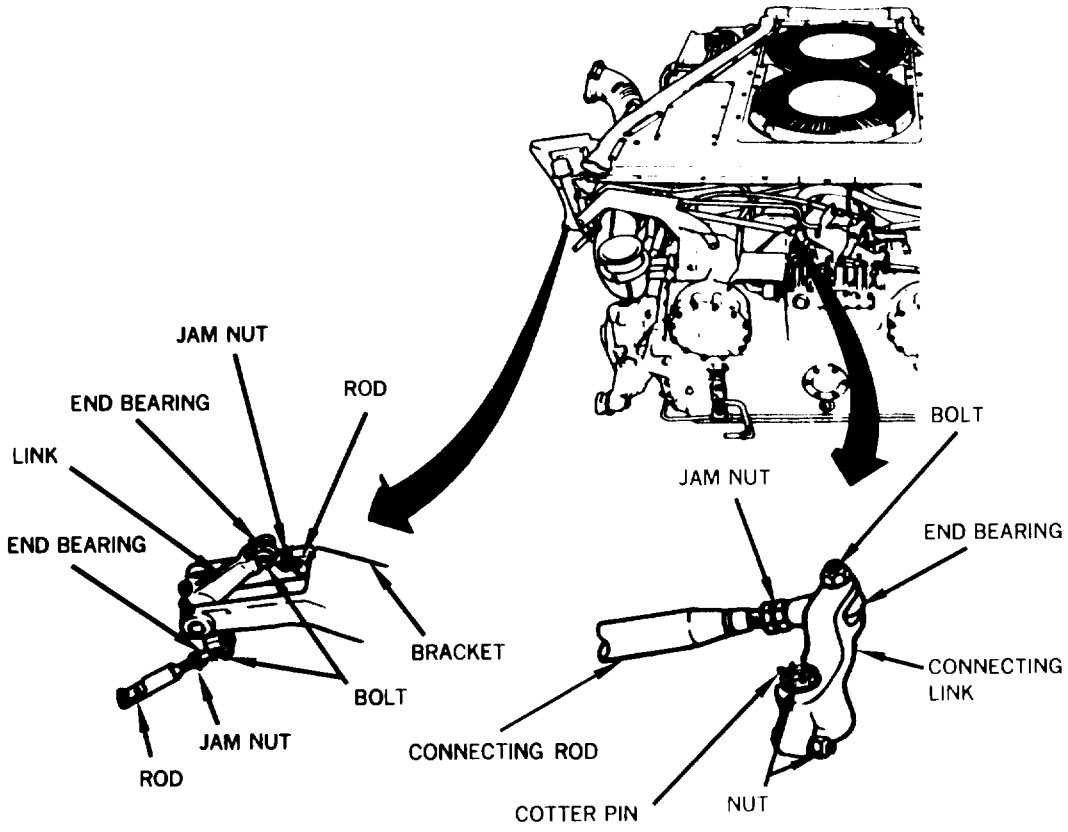
Shifting Bellcrank Housing and Linkage Sleeve Lubricant

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Shifting Bellcrank Housing		AR	S	0.1
Shifting Linkage Sleeve All Temperatures	WTR (G-395) MIL-G-81322	AR	S	0.5

For arctic operation, see FM 9-207

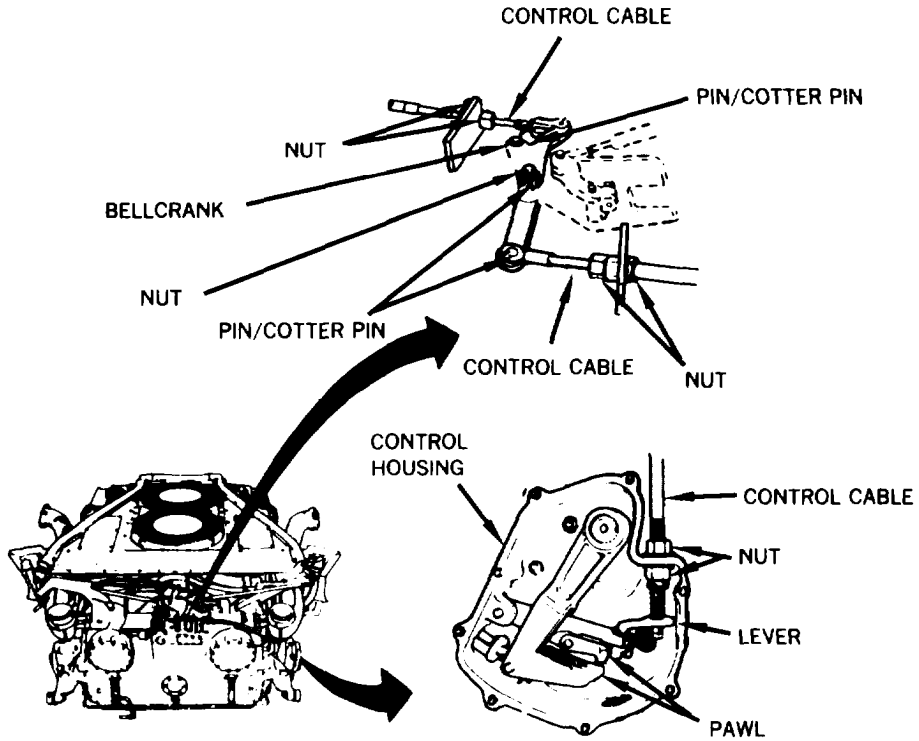
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
70	Semiannual	Steering Control Linkage	Check steering control brackets, links, rods, and end bearings, on top of transmission, for looseness, damage, or corrosion: . Check that bolts and jam nuts are tight. Check connecting rod, end bearing, and connecting link for looseness, damage, or wear. Check that bolts, nuts, and jam nut are tight and cotter pin is not missing or damaged.	



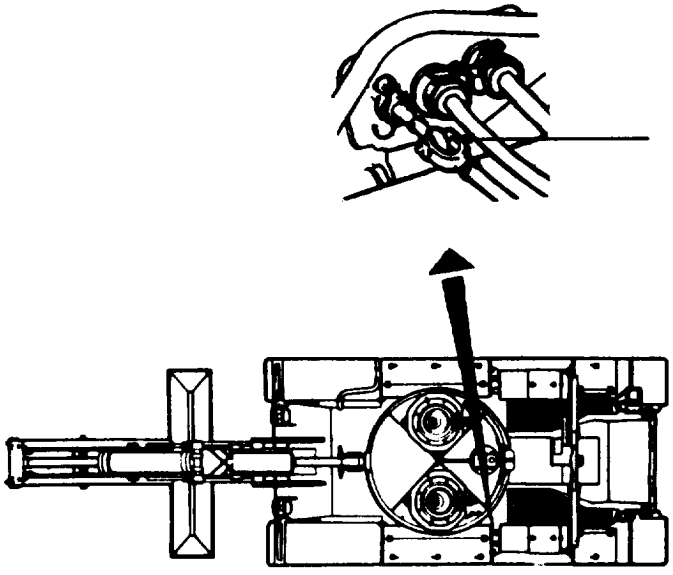
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
71	Semiannual	Brake Control and Linkage	Check control cable and bellcrank, at top of transmission, for looseness, damage, or corrosion. Check security of pin/cotter pins and nuts. Remove cover and gasket from brake control housing on each side of transmission. Check cable for looseness, damage, or corrosion. Check that nuts are tight. Check for damage to teeth of remote control lever and of pawl. Clean all moving parts with CLP. Install cover and gasket on brake control housing on each side of transmission.	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
72	Semiannual	Accelerator Control Flange Housing	Lubricate accelerator control flange housing.	



Accelerator Control Flange Housing Lubricant

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Accelerator Control Flange Housing All Temperatures	WTR (G-395) MIL-G-81322	AR	S	0.5

For arctic operation, see FM 9-207

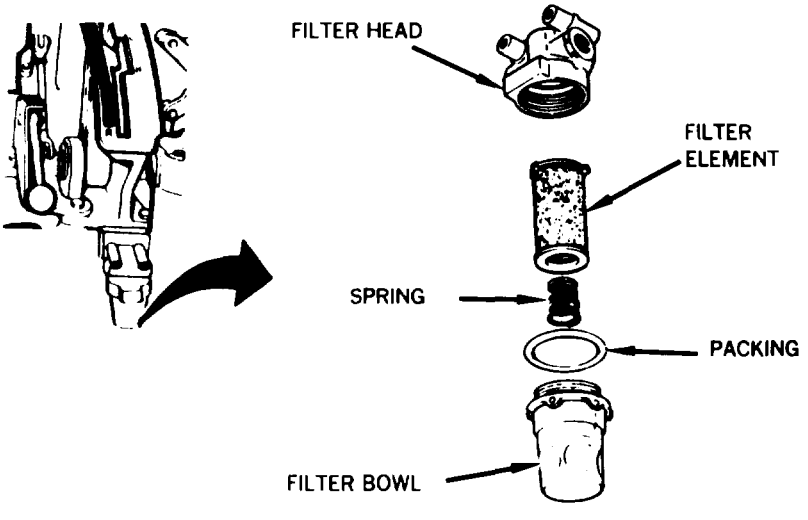
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
73	Semiannual	Primer Pump Filter	To service primer pump filter assembly, unscrew filter bowl from filter head. Remove packing and discard. Remove filter element and spring.	

WARNING

Dry Cleaning Solvent P-D-680 is toxic and flammable. To avoid injury, wear protective goggles and gloves and use in a well-ventilated area. Avoid contact with skin, eyes, and clothes, and do not breathe vapors. Do not use near open fire or excessive heat. The flash point for Type I Dry Cleaning Solvent is 100°F (38°C), and for Type II is 140°F (60°C). If you become dizzy while using Dry Cleaning Solvent, get fresh air immediately and get medical aid. If contact with eyes is made, wash your eyes with water and get medical aid immediately.

		Clean filter bowl, filter head, element, and spring with dry cleaning solvent (Item 55, Appendix D).	



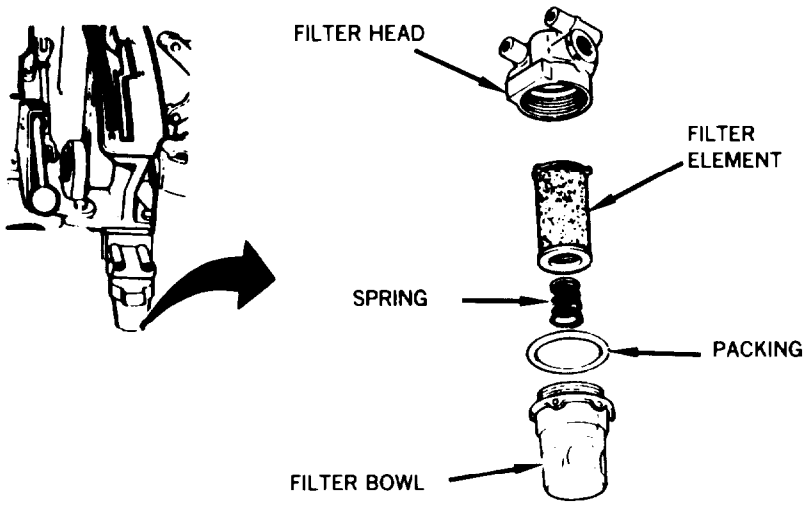
Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
73	Semiannual	Primer Pump Filter - Continued		

WARNING

Compressed air for cleaning purposes must not exceed 30 psi. Use only with effective chip guarding and personal protective equipment (goggles shield, gloves, etc.).

	Blow low pressure compressed air through filter element to remove dirt particles. Inspect element for dents, tears, and separations. Replace defective filter element. Inspect for broken or cracked components. Position spring and filter element in filter bowl. Position new packing over lip of filter bowl and install on filter head.	



Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
74	Semiannual	Manifold Heater (Left and Right Sides)	Install ground hop kit (page 5-25). Check that all cables and hoses are connected for ground hop test.	

WARNING

Keep hand away from high voltage ignition cable. Perform the following steps in sequence given to prevent damage to engine and possible injury to personnel.

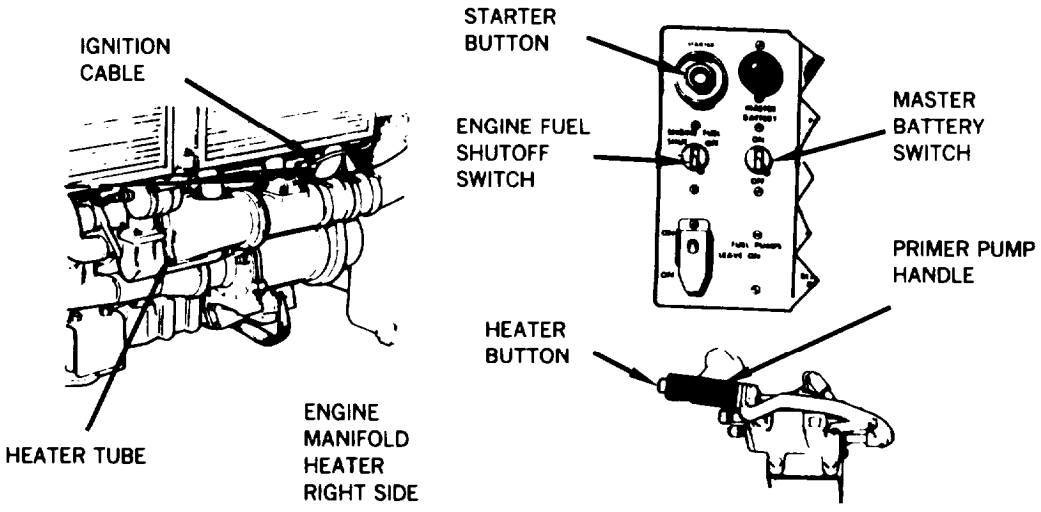
Position a person on each side of engine with hand on intake manifold heater tube.

Set MASTER BATTERY switch to ON. Press STARTER button and at same time operate primer pump handle and press heater button on handle for no more than 15 seconds.

Check that heater is working by feeling for heat at each intake heater tube.

If heat is felt, heater is working. Shut off engine by raising and holding ENGINE FUEL SHUT OFF switch until engine stops.

Set MASTER BATTERY switch to OFF.

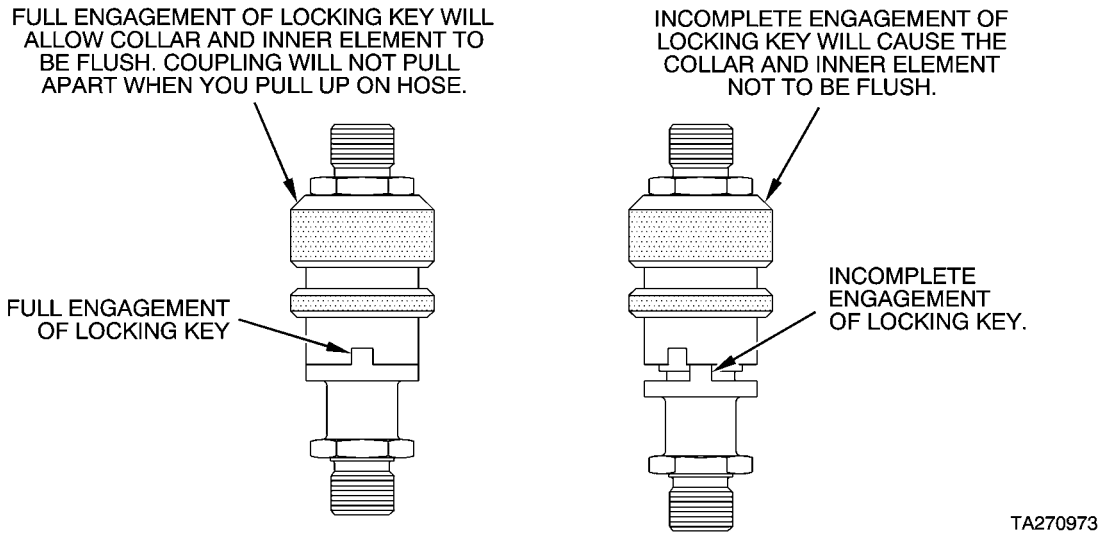


Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
75	Semiannual	Powerplant	Perform out-of-vehicle engine test run (ground hop) (page 5-25). After engine test run, install powerplant (page 5-14).	

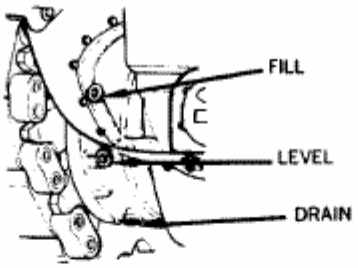
WARNING

Failure to correctly connect quick disconnect (full engagement) will result in brake failure and could cause serious injury or death.



Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location Item to Check/Service	Procedure	Not Fully Mission Capable if:
76	Semiannual	Roadtest	Perform final road test.	
77	Biennial	Final Drive (Left and Right Sides)	Drain and fill. To drain, remove drain plug from bottom of housing. Drain only after operation while oil is warm. Drain into suitable container. Check magnetic drain plug for metal shavings. After draining, clean and install drain plug. Fill to proper level (page 3-72).	Any large metal chips or shavings.



Final Drive Lubricant

Temperature Range	Lubricant Mil. Symbol (NATO Code) Specification	Capacity	Interval	Man-hour
Final Drive		8 qt	B	0.4
+ 10°F to + 125°F (-12°C to + 52°C)	OE/HDO-30 (0-238) MIL-L-2104			
-70°F to + 20°F (-57°C to -7°C)	OEA (0-183) MIL-L-46167			

For arctic operation, see FM 9-207

Preventive Maintenance Checks and Services for M60A1 AVLB Hull - Continued

Item No.	Interval	Location: Item to Check/Service	Procedure	Not Fully Mission Capable if:
78	Biennial	Suspension System (Left and Right Sides)	HARD TIME SERVICE Remove six roadwheel arms (page 14-2). Disassemble, clean, and inspect six roadwheel arms (14-9). Disassemble, clean, and inspect six roadwheel hubs (page 14-15). Disconnect track adjusting link at compensating idler wheel (page 14-55 or 14-99). Remove compensating idler arm (page 14-62). Remove track support rollers (page 14-34). Install roadwheel arm (page 14-6). Install track adjusting link at compensating idlerwheel (page 14-57). Install track support rollers (page 14-40).	Any worn bearings. Damaged or leaking seals.

PMCS MANDATORY REPLACEMENT PARTS LISTS

The following tables provide a list of all mandatory replacement parts required to perform semiannual, annual, or biennial PMCS. The semiannual/annual PMCS parts list contains the quantity of parts required to perform one semiannual PMCS or one annual PMCS. The biennial PMCS parts list contains the quantity of parts required to perform one annual PMCS and all the additional mandatory replacement parts to complete the required biennial tasks.

SEMIANNUAL/ANNUAL PMCS PARTS LIST

Nomenclature	NSN	Part Number and CAGE	Quantity
Packing, preformed	5330-00-180-9951	MS9068-038 (96906)	2
Packing, preformed	5330-00-724-5541	MS9068-018 (96906)	2
Packing, preformed	5330-00-724-7902	MS9068-013 (96906)	2
Seal, antipilferage	5340-00-902-0426	MS51938-6 (96906)	6
Filter	4240-00-828-3952	D5-19-2350 (81361)	2
Filter	4240-00-866-1825	C5-19-1175 (81361)	1
Valve, vent (early model)	4820-00-726-4719	5196397 (57733)	2
Kit, fuel filter	4330-00-801-1152	5702738 (19207)	1
Kit, fuel filter	4330-00-410-1964	5704487 (19207)	1
Filter, fuel	2940-00-808-2421	A-3002-1 (08181)	1
Kit, filter, fluid	4330-00-397-3404	5704486 (19207)	1
Gasket, brake housing	5330-00-888-9403	10911888 (19207)	2
Packing, preformed	5330-00-265-1089	7413738 (19207)	1
Parts Kit, fluid	4330-00-229-5723	5703567 (19207)	2

BIENNIAL PMCS PARTS LIST

Nomenclature	NSN	Part Number and CAGE	Quantity
Packing, preformed	5330-00-180-9951	MS9068-038 (96906)	2
Packing, preformed	5330-00-724-5541	MS9068-018 (96906)	2
Packing, preformed	5330-00-724-7902	MS9068-013 (96906)	2
Seal, antipilferage	5340-00-902-0426	MS51938-6 (96906)	6
Filter	4240-00-828-3952	D5-19-2350 (81361)	2
Filter	4240-00-866-1825	C5-19-1175 (81361)	1
Valve, vent (early model)	4820-00-726-4719	5196397 (57733)	2
Kit, fuel filter	4330-00-801-1152	5702738 (19207)	1
Kit, fuel filter	4330-00-410-1964	5704487 (19207)	1
Filter, fuel	2940-00-808-2421	A-3002-1 (08181)	1
Kit, filter, fluid	4330-00-397-3404	5704486 (19207)	1
Gasket, brake housing	5330-00-888-9403	10911888 (19207)	2
Packing, preformed	5330-00-265-1089	7413738 (19207)	1
Parts Kit, fluid	4330-00-229-5723	5703567 (19207)	2
Seal, plain	5330-01-126-8190	12270997 (19207)	14
Seal, plain	2530-00-736-4672	7364672 (19207)	14
Seal, plain	5330-00-350-9945	343XW420 (80201)	6
Gasket	5330-00-291-8991	8387092 (19207)	21
Gasket	5330-00-291-7465	8387093 (19207)	14

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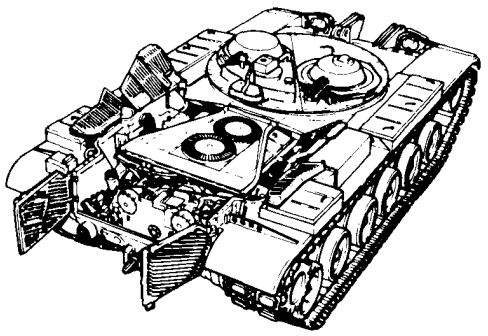
CHAPTER 4
TROUBLESHOOTING

CONTENTS | **PAGE**

USER GUIDE

NOTE

This troubleshooting USER GUIDE is presented in the same format as the detailed troubleshooting procedures you will be using to identify and correct the trouble in the M60A1 AVLB vehicle.



USER GUIDE APPROACH

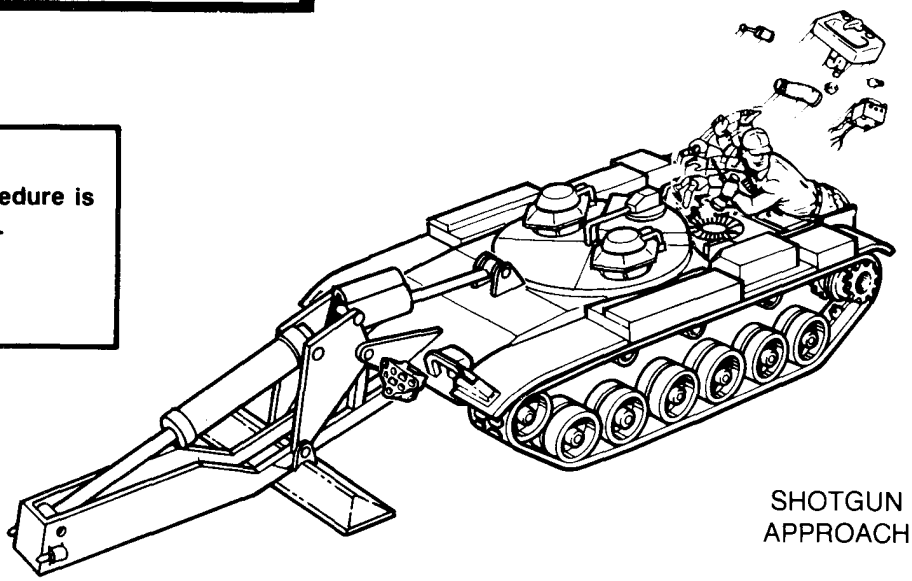
1 **Check the four key steps in logical troubleshooting (Troubleshooting without the SHOTGUN APPROACH).**

- Identify the trouble.
- Find the right troubleshooting procedure.
- Determine the test equipment, special tools and number of technicians needed to perform the troubleshooting procedure.
- Use the Detailed Troubleshooting Procedure to isolate and repair the trouble.

How do you "identify" the trouble spot?

NOTE

This line indicates the procedure is continued on the next page.



SHOTGUN APPROACH

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USER GUIDE
(Continued)

NOTE

This line indicates the procedure is continued from the previous page.

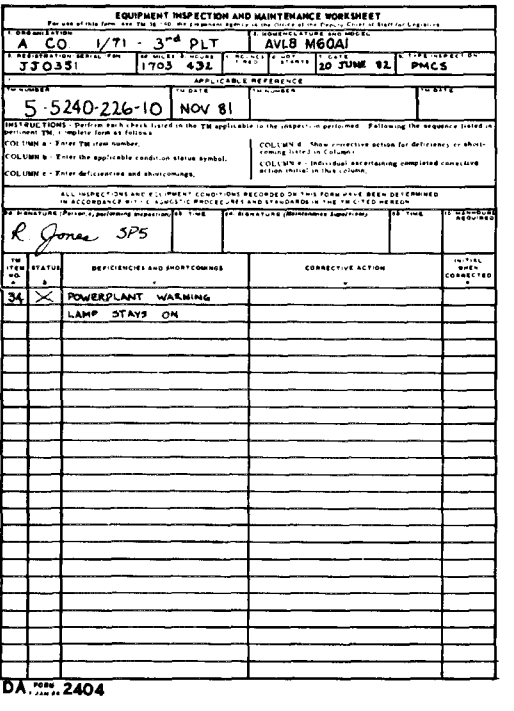
2 **To identify the trouble spot, check DA Form 2404 filled out by the crew.**

- Check what the crew has entered on DA Form 2404.
- Question the crew to get as much information as possible about the trouble.

Example:

- Are the gages reading normal?
- Has the vehicle been using excessive oil?
- Was the engine running?

- Make sure there was no crew error in following the operator procedure listed in TM 5-5420-202-10.
- If necessary, operate the vehicle to help identify the trouble.



EQUIPMENT INSPECTION AND MAINTENANCE WORKSHEET

A CO 1/71 - 3rd PLT		AVLB M60A1		
JJ0331	1703 432		20 JUNE 82	PMCS

APPLICABLE REFERENCE

TM NUMBER	TM DATE	TM NUMBER	TM DATE
5-5240-226-10	NOV 81		

R Jones SP5

ITEM NO.	STATUS	DEFICIENCIES AND SHORTCOMINGS	CORRECTIVE ACTION	INITIAL WHEN CORRECTED
34	X	POWERPLANT WARNING LAMP STAYS ON		

DA FORM 2404

WARNING

Do not attempt to operate the vehicle if there is any chance the trouble may harm personnel or damage equipment. For example: Brakes don't work.

Now that you have an idea what the trouble is, how do you find the right troubleshooting procedure?

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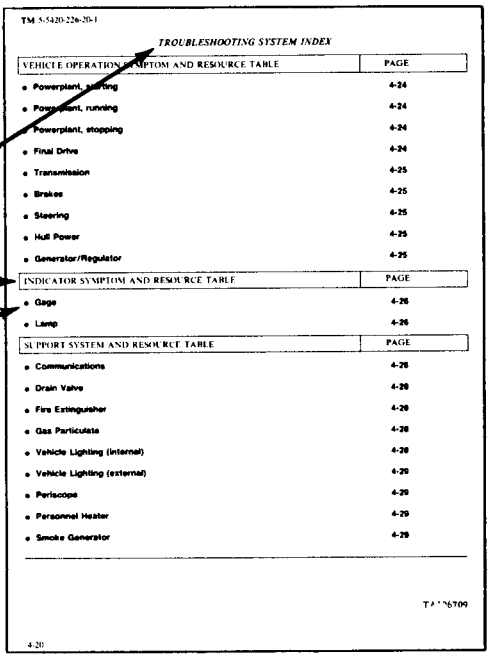
USER GUIDE
(Continued)

NOTE

The circled number at the top left corner of each block is a step number.

3 **Check the TROUBLESHOOTING SYSTEM INDEX to find the proper system/subsystem.**

- Turn to the TROUBLESHOOTING SYSTEM INDEX (page 4-20).
- Find the system in which your trouble occurs.
- Find the subsystem in which your trouble occurs.



TM 5-5420-226-20-1

TROUBLESHOOTING SYSTEM INDEX

TA 256709

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NOTE

- **Most troubleshooting procedures contain many branches (paths).**
- **You will not follow every possible branch.**
- **The branch you follow will depend on your answer to each question block.**
- **If your answer is no, follow this branch.**
- **If your answer is yes, follow this branch.**

Were you able to find the proper system/subsystem in which your trouble occurs?

YES

NO

4 **If you have trouble locating the proper system/subsystem, check the TROUBLESHOOTING SUBJECT INDEX (page 4-21).**

- **See Step (8) .**

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USER GUIDE
(Continued)

5 **Find the right Troubleshooting Procedure.**

- Note the troubleshooting SYMPTOM AND RESOURCE TABLE listed for the SYSTEM/SUBSYSTEM in which your trouble occurs.
- Turn to the page number indicated for the above table.
- Find the same subsystem.
- Check the symptom titles listed under this subsystem until you find the one that describes your trouble.

Have you found the proper symptom title?

NO

6 **Notify your supervisor.**

YES

7

- **Determine the test equipment, special tools and number of technicians required.**
- **See Step (13) .**

TROUBLESHOOTING SYSTEM INDEX

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INDICATOR SYMPTOM AND RESOURCE TABLE

SUBSYSTEM SYMPTOM NO	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED: MULTIMETER OR STE/ICE	RESOURCES REQUIRED: SPECIAL TOOLS REFERENCE CODE	RESOURCES REQUIRED: NO PERSONNEL
		A	B	C	D
GAGE					
32	Engine oil pressure gage will not show pressure (Powerplant warning lamp not on - all other gages read normal).		X		2
33	Engine oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal).		X		2
34	Transmission oil pressure gage shows no pressure (Engine running - all other gages read normal).		X	6, 31	2
35	Transmission oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal).		X	31	2
36	Battery/Generator gage will not work (all other gages work).		X		1
37	Battery/generator gage pointer in right red area.		X		1
38	Battery/generator gage pointer in yellow or left red area (Engine running).		X		2
39	Fuel level gage will not work (all other gages work).		X		2
40	All gages on gage instrument panel will not work (Engine running).		X		1
LAMP					
41	Powerplant warning lamp will not come on (Engine not running).		X		2
42	Powerplant warning lamp on (Engine running - all gages read normal).		X	31	2
43	Master battery indicator lamp will not light (There is power in vehicle).		X		1
44	Gas particulate indicator lamp will not light (Gas particulate blower works).		X		1
45	Personnel heater indicator lamp will not light (Personnel heater works).		X		1
46	Night vision indicator lamp will not light (IR periscope will work).		X		1

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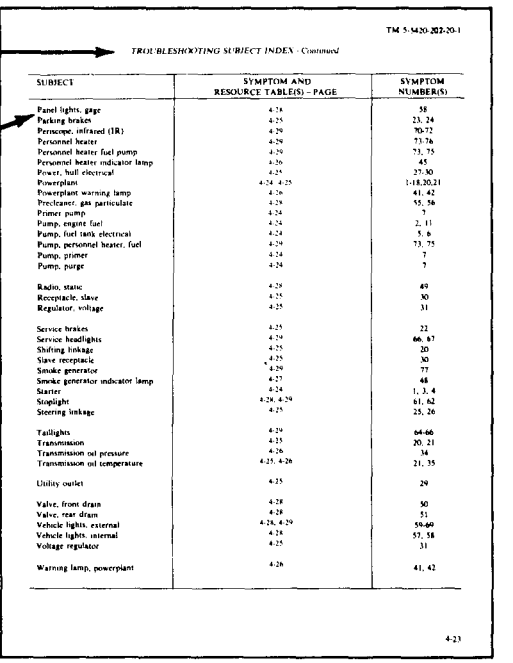
USER GUIDE
(Continued)

FROM STEP 4

8 **If you cannot locate the proper system/subsystem in the SYSTEM INDEX, find an item listed in the TROUBLESHOOTING SUBJECT INDEX that pertains to your trouble.**

- Turn to TROUBLESHOOTING SUBJECT INDEX (page 4-21).
- Check the subjects listed in this index until you find one that pertains to your trouble.

Can you find an item that pertains to your trouble?



TM 5-5420-202-20-1

TROUBLESHOOTING SUBJECT INDEX - Continued

SUBJECT	SYMPTOM AND RESOURCE TABLE(S) - PAGE	SYMPTOM NUMBER(S)
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Pump, fuel tank electrical	4-24	5, 6
Pump, personnel heater, fuel	4-29	73, 75
Pump, primer	4-24	7
Pump, purge	4-24	7
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Vehicle lights, internal	4-28	57, 58
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YES

NO

9 **Notify your supervisor.**

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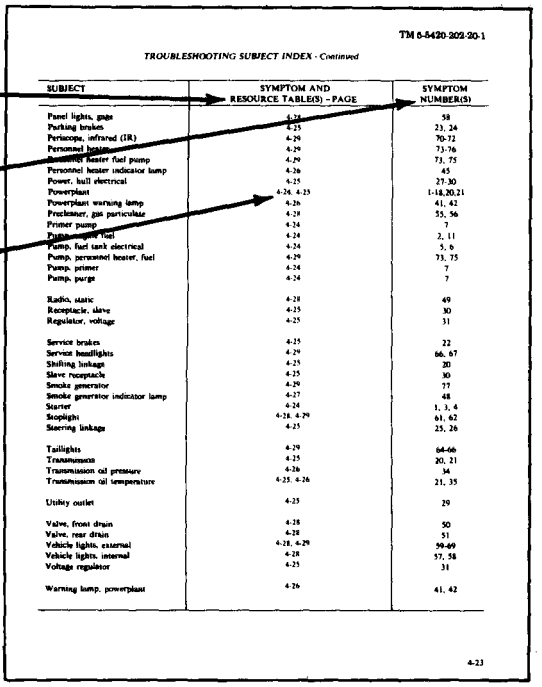
USER GUIDE
(Continued)

10

Find the right Troubleshooting Procedure.

- Check the SYMPTOM and RESOURCE TABLE listed for the subject you have selected.
- Note the symptom number(s) listed for your subject.
- Turn to the page number indicated for the SYMPTOM and RESOURCE TABLE.



TM 5-5420-202-20-1

TROUBLESHOOTING SUBJECT INDEX - Continued

SUBJECT	SYMPTOM AND RESOURCE TABLE(S) - PAGE	SYMPTOM NUMBER(S)
Panel lights, gage	4-25	58
Parking brakes	4-25	23, 24
Periscope, infrared (IR)	4-29	70-72
Personnel heater	4-29	73-76
Personnel heater fuel pump	4-29	73, 75
Personnel heater indicator lamp	4-26	45
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Pump, primer	4-24	7
Pump, purge	4-24	7
Radio, static	4-28	49
Receptacle, slave	4-25	30
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Utility outlet	4-25	29
Valve, front drain	4-28	50
Valve, rear drain	4-28	51
Vehicle lights, external	4-28, 4-29	59-69
Vehicle lights, internal	4-28	57, 58
Voltage regulator	4-25	31
Warning lamp, powerplant	4-26	41, 42

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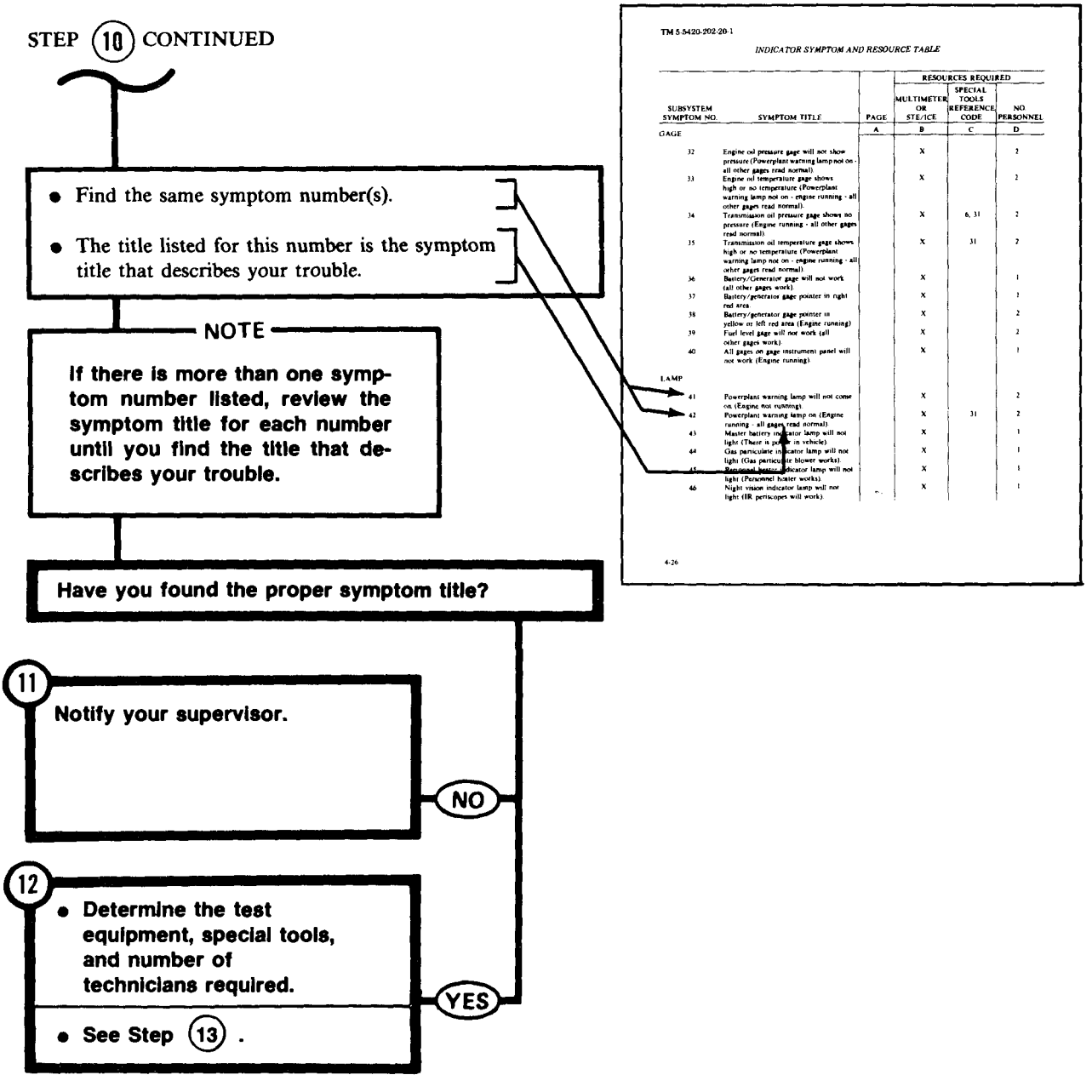
USER GUIDE
(Continued)



TA249893

USER GUIDE
(Continued)

FROM STEP (7) OR (12)

(13) Determine the test equipment, special tools, and number of technicians needed to perform the troubleshooting procedure.

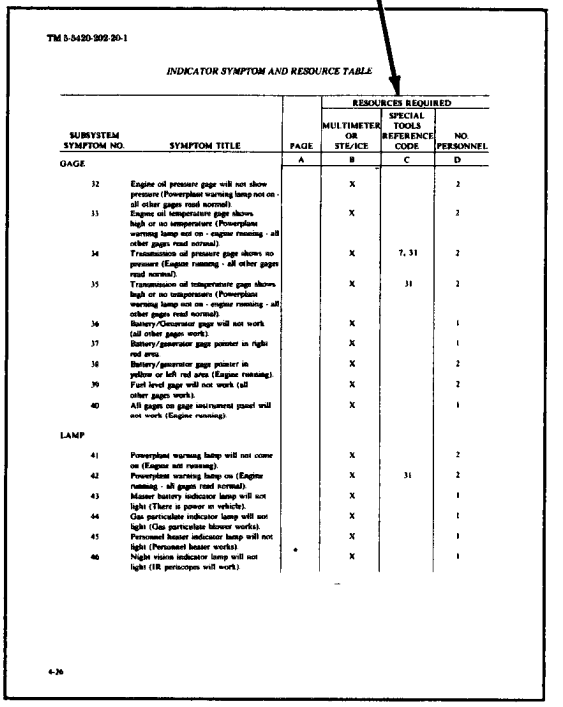
- Locate the RESOURCES REQUIRED columns.
- Check column B to determine if you will need test equipment. Either a multimeter or a STE/ICE set can be used. You do not need both.
- Check column C to determine if you will need special tools.

NOTE

- **If Column C indicates that special tools are needed, see Chapter 3, Section 1.**
- **Locate the same item number in this section. This will tell you which special tool is needed.**

- Check column D to determine how many technicians are required to perform the procedure.

Now that you have identified the trouble; found the right troubleshooting procedure; and obtained the test equipment, special tools, and number of technicians required: What is the last step to good troubleshooting?



TM 5-5420-202-20-1

INDICATOR SYMPTOM AND RESOURCE TABLE

SUBSYSTEM SYMPTOM NO.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED: MULTIMETER OR STE/ICE	RESOURCES REQUIRED: SPECIAL TOOLS REFERENCE CODE	RESOURCES REQUIRED: NO. PERSONNEL
GAGE		A	B	C	D
32	Engine oil pressure gage will not show pressure (Powerplant warning lamp not on - all other gages read normal)		X		2
33	Engine oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal)		X		2
34	Transmission oil pressure gage shows no pressure (Engine running - all other gages read normal)		X	7, 31	2
35	Transmission oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal)		X	31	2
36	Battery/Generator gage will not work (all other gages work)		X		1
37	Battery/generator gage pointer in right red area		X		1
38	Battery/generator gage pointer in yellow or left red area (Engine running)		X		2
39	Fuel level gage will not work (all other gages work)		X		2
40	All gages on gage instrument panel will not work (Engine running)		X		1
LAMP					
41	Powerplant warning lamp will not come on (Engine not running)		X		2
42	Powerplant warning lamp on (Engine running - all gages read normal)		X	31	2
43	Master battery indicator lamp will not light (There is power in vehicle)		X		1
44	Gas particulate indicator lamp will not light (Gas particulate blower works)		X		1
45	Personnel heater indicator lamp will not light (Personnel heater works)		X		1
46	Night vision indicator lamp will not light (IR periscopes will work)		X		1

4-26

TA249894

USER GUIDE
(Continued)

WARNING

Do not start your troubleshooting procedure until you have studied Step (16) . This step contains important information you will need to know in order to perform the procedure safely.

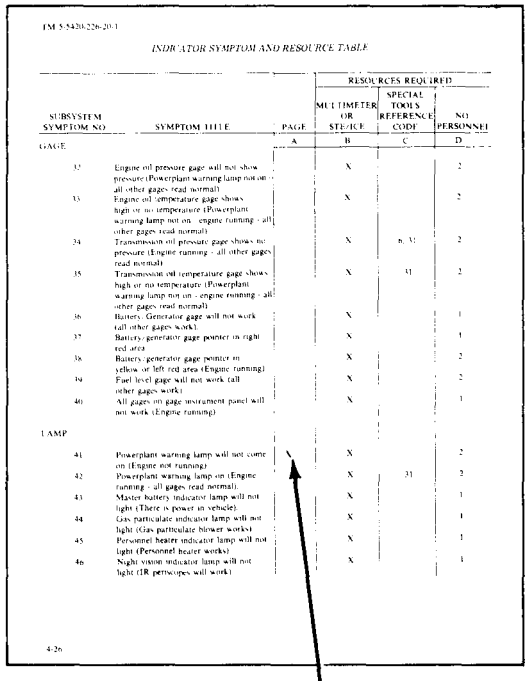
14 **Use the troubleshooting procedure to locate, isolate, and repair the trouble.**

- After studying Step (16) , you will be ready to begin your Troubleshooting Procedure.

Are you familiar with the IMPORTANT TROUBLESHOOTING INFORMATION contained in Step (16) ?

NO

YES



TM 5-5420-226-20-1

INDICATOR SYMPTOM AND RESOURCE TABLE

SUBSYSTEM SYMPTOM NO	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED: MULTIMETER OR STE/ICE	SPECIAL TOOLS REFERENCE CODE	NO PERSONNEL
		A	B	C	D
GAGE					
32	Engine oil pressure gage will not show pressure (Powerplant warning lamp not on - all other gages read normal)		X		2
33	Engine oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal)		X		2
34	Transmission oil pressure gage shows no pressure (Engine running - all other gages read normal)		X	6, 31	2
35	Transmission oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal)		X	31	2
36	Battery-Generator gage will not work (all other gages work)		X		1
37	Battery-generator gage pointer in right red area		X		1
38	Battery-generator gage pointer in yellow or left red area (Engine running)		X		2
39	Fuel level gage will not work (all other gages work)		X		2
40	All gages on gage instrument panel will not work (Engine running)		X		1
LAMP					
41	Powerplant warning lamp will not come on (Engine not running)		X		2
42	Powerplant warning lamp on (Engine running - all gages read normal)		X	31	2
43	Master battery indicator lamp will not light (There is power in vehicle)		X		1
44	Gas particulate indicator lamp will not light (Gas particulate blower works)		X		1
45	Personnel heater indicator lamp will not light (Personnel heater works)		X		1
46	Night vision indicator lamp will not light (IR periscopes will work)		X		1

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15

- **Turn to the page number indicated in column A.**
- **On this page you will locate the procedure that pertains to your trouble.**
- **Use this Detailed Troubleshooting procedure to locate, isolate, and repair the trouble.**

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USER GUIDE
(Continued)

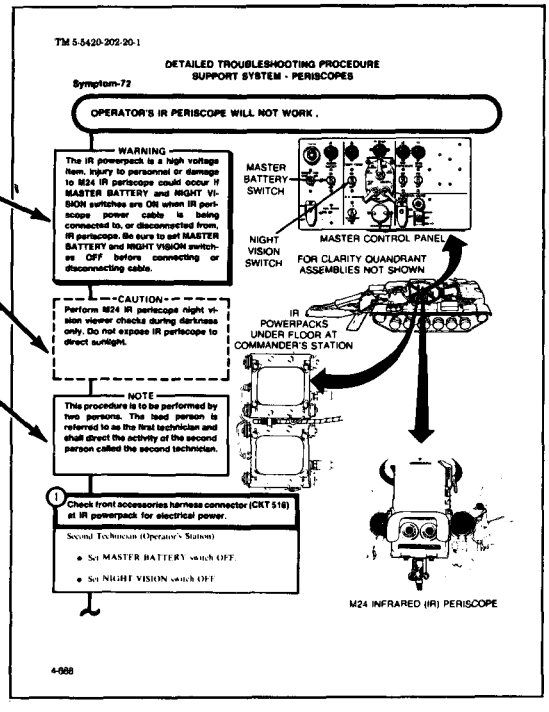
16

IMPORTANT TROUBLESHOOTING INFORMATION.

- Be sure you read every WARNING, CAUTION, and NOTE.
- A WARNING indicates possible injury to personnel. It may also include equipment damage.
- A CAUTION indicates possible equipment damage only.
- A NOTE contains information you will need to know in order to properly perform the troubleshooting procedure.

WARNING

- **Be sure there is no electrical power at the cable to be disconnected or repaired.**
- **Before making cable repairs or disconnecting any cable, be sure MASTER BATTERY switch is set OFF.**



TA249896

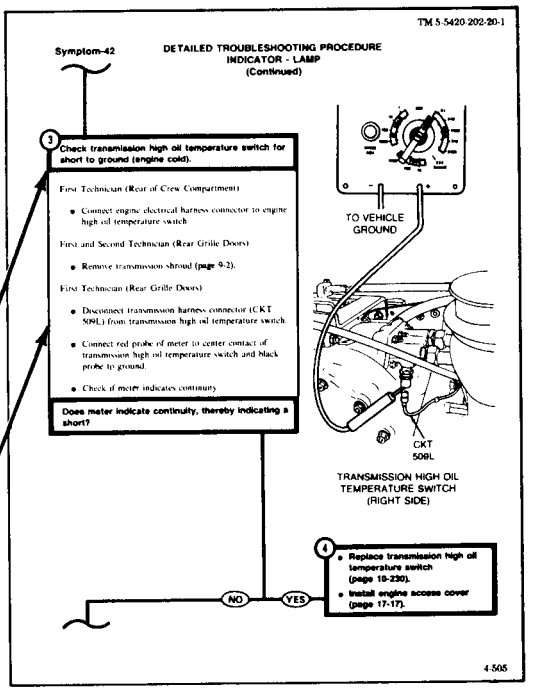
USER GUIDE
(Continued)

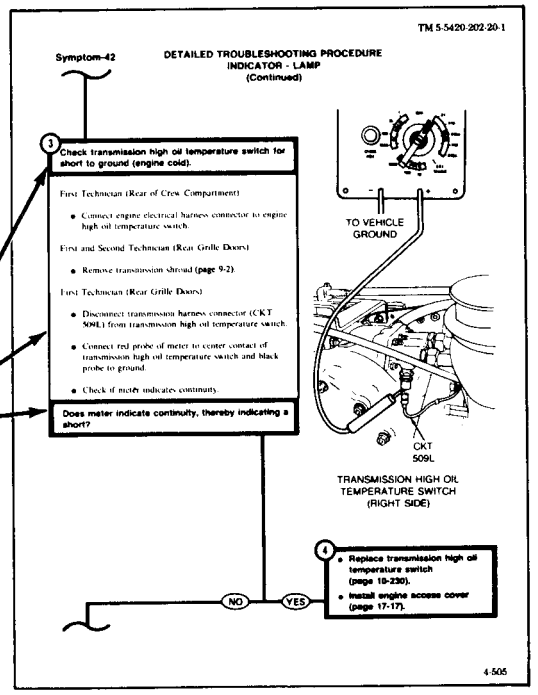
STEP 16 CONTINUED

WARNING

- **Setting MASTER BATTERY switch OFF will not de-energize the following circuits: 49, 81, 400, 459 and 975. When working with any of the above circuits, the battery ground straps must be disconnected.**
- **When working with CKT 405, set HEATER MASTER switch OFF.**
- **Failure to de-energize any electrical circuit prior to working on it may result in serious injury to personnel and damage to equipment.**

- If you are a skilled technician and already know how to perform the test or inspection called for here, you may omit the part of that step that is not shaded with heavy lines and printed in bold type.
- If you do not know how to do the test or inspection called for, you must perform every part of each step.





TA249897

USER GUIDE
(Continued)

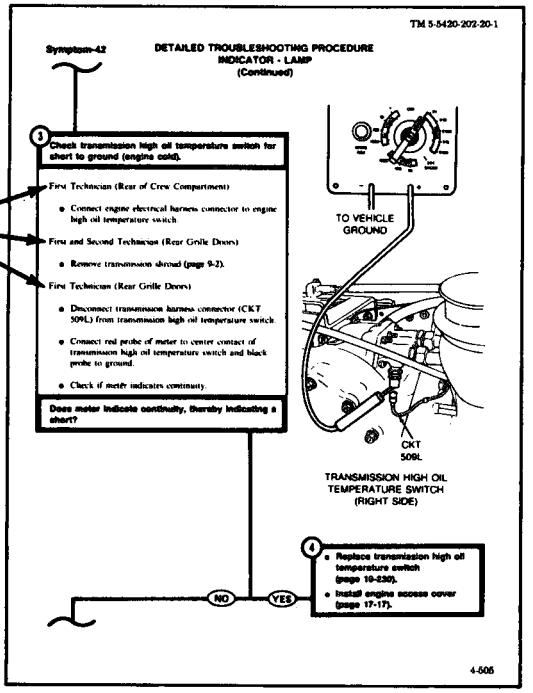
STEP (16) CONTINUED

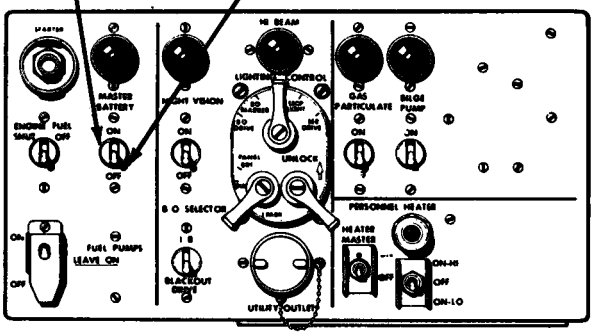
- These locators tell you two things:
  - Which technician will do the task that follows.
  - Where this technician must be in order to do the task.

EXAMPLE: First Technician (Rear Grille Doors)

- The words printed in BOLD TYPE show you what you will see marked on the actual equipment you will be using.

EXAMPLE: • Set MASTER BATTERY switch OFF.



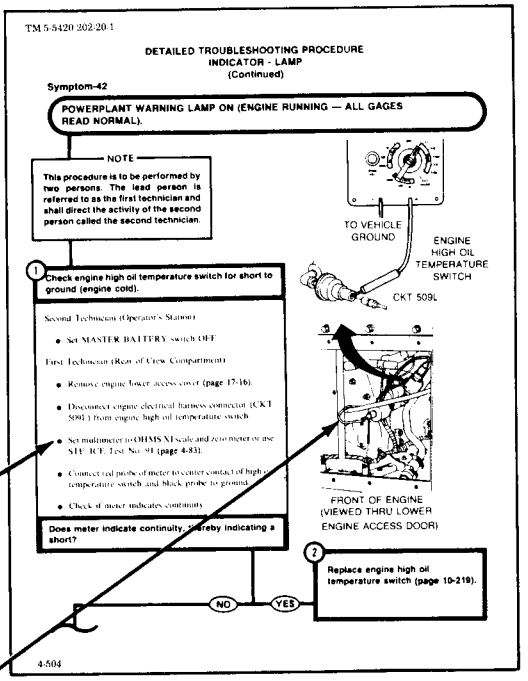


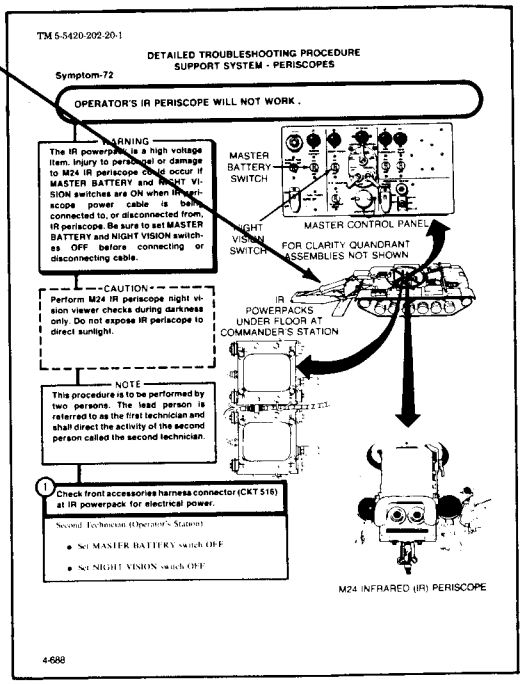
TA249898

USER GUIDE
(Continued)

STEP 16 CONTINUED

- Some steps call for the use of test equipment.
- If you do not know how to use this equipment (or if you have forgotten how to do the test called for) see page 4-30 for multimeter instructions or page 4-46 for STE/ICE instructions.
- A picture is included with most steps to make the task easier to understand, or show you where a particular part is located.



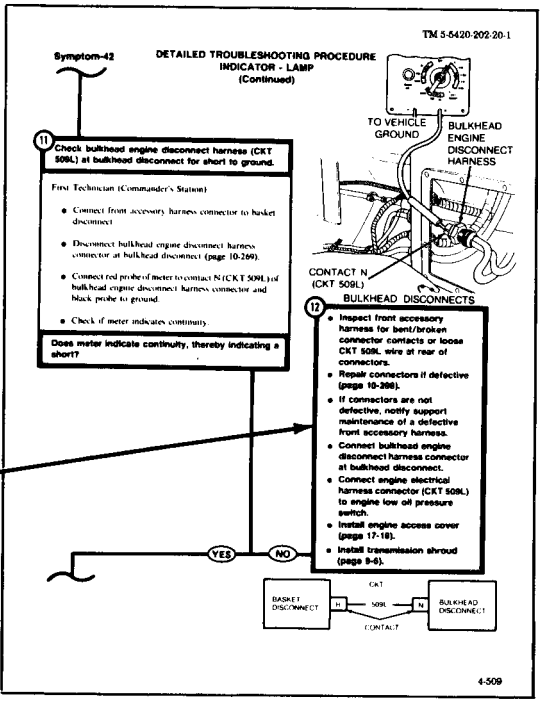


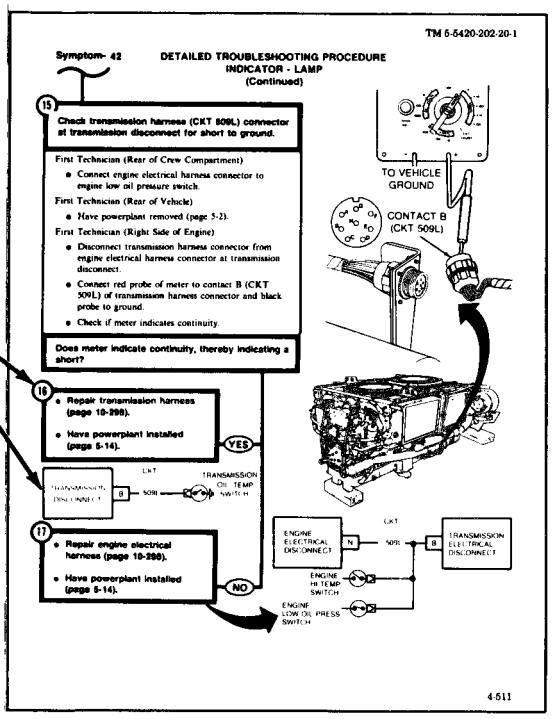
TA249899

USER GUIDE
(Continued)

STEP (16) CONTINUED

- When a step tells you INSPECT for bent/broken connector contacts or loose wires at the rear of connectors (or repair a harness) - a harness circuit diagram is included.
- This harness circuit diagram will show you which connectors to inspect/repair and where they are located.
- See page 4-18 for explanation of these harness circuit diagrams.





TA249900

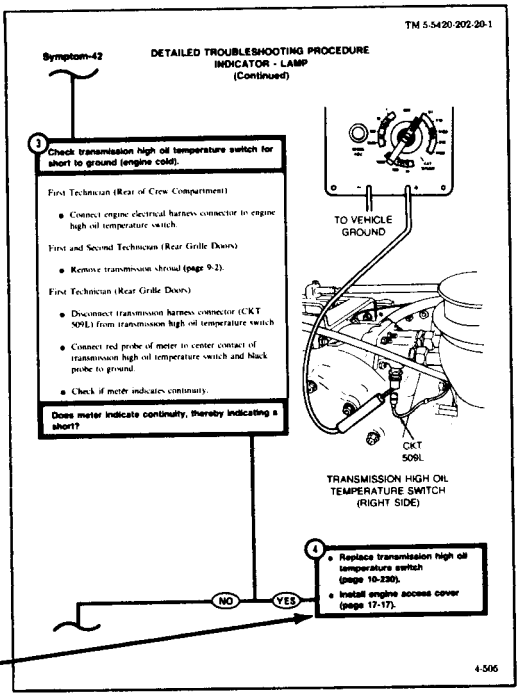
USER GUIDE
(Continued)

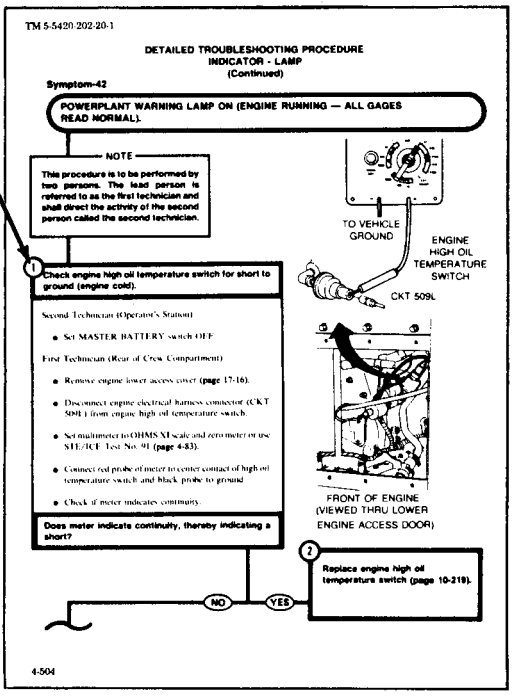
STEP (16) CONTINUED

NOTE

- **For the benefit of the skilled technician, a complete wiring diagram of the vehicle hull is included in this manual.**
- **See Fig F0-1 for this diagram.**

- After you finish any repair in a troubleshooting procedure, check to see that the trouble has been corrected.
- If the problem still exists, go back to Step (1) of the same procedure and continue troubleshooting.





TA249901

USER GUIDE
(Continued)

STEP 16 CONTINUED

Do you understand all the information in this USER GUIDE?

NO

17 **Ask your supervisor to help you with the part you don't understand.**

YES

18

- **Turn to the page number indicated in column A.**
- **On this page you will see the procedure that pertains to your trouble.**
- **Use this DETAILED TROUBLESHOOTING PROCEDURE to locate, isolate and repair the trouble.**

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INDICATOR SYMPTOM AND RESOURCE TABLE

SUBSYSTEM SYMPTOM NO.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED: MULTIMETER OR STE/ICE	SPECIAL TOOLS REFERENCE CODE	NO. PERSONNEL
		A	B	C	D
GAGE					
32	Engine oil pressure gage will not show pressure (Powerplant warning lamp not on - all other gages read normal).		X		2
33	Engine oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal).		X		2
34	Transmission oil pressure gage shows no pressure (Engine running - all other gages read normal).		X	6, 31	2
35	Transmission oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal).		X	31	2
36	Battery/Generator gage will not work (all other gages work).		X		1
37	Battery/generator gage pointer in right red area.		X		1
38	Battery/generator gage pointer in yellow or left red area (Engine running).		X		2
39	Fuel level gage will not work (all other gages work).		X		2
40	All gages on gage instrument panel will not work (Engine running).		X		1
LAMP					
41	Powerplant warning lamp will not come on (Engine not running).	4-26	X		2
42	Powerplant warning lamp on (Engine running - all gages read normal).		X	31	2
43	Master battery indicator lamp will not light (There is power to vehicle).		X		1
44	Gas particulate indicator lamp will not light (Gas particulate blower works).		X		1
45	Personnel heater indicator lamp will not light (Personnel heater works).		X		1
46	Night vision indicator lamp will not light (IR periscopes will work).		X		1

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DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

Symptom 42

POWERPLANT WARNING LAMP ON (ENGINE RUNNING — ALL GAGES READ NORMAL).

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check engine high oil temperature switch for short to ground (engine cold).

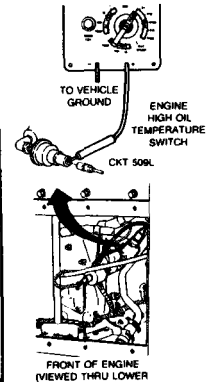
Second Technician (Operator's Station)
- Set MASTER BATTERY switch OFF.

First Technician (Rear of Crew Compartment)
- Remove engine lower access cover (page 17-16).
- Disconnect engine electrical harness connector (CKT 509L) from engine high oil temperature switch.
- Set multimeter to OHMS X1 scale and zero meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to center contact of high oil temperature switch and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short?

NO YES

2 Replace engine high oil temperature switch (page 10-210).



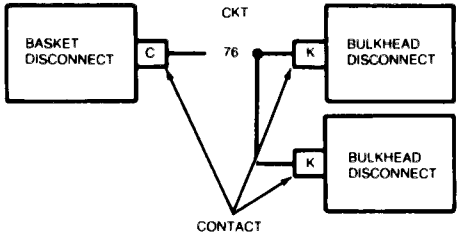
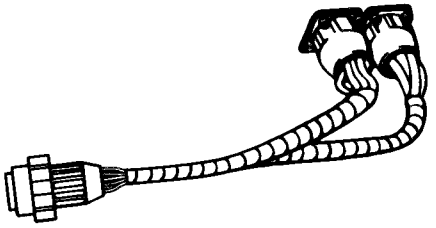
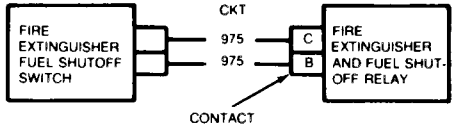
4-504

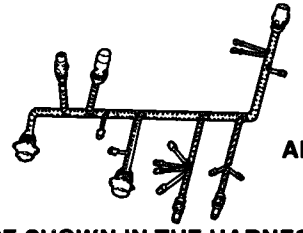
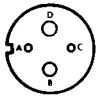
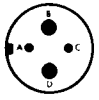
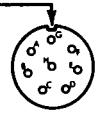
TA249902

HARNESS CIRCUIT DIAGRAMS

THIS DIAGRAM	REPRESENTS	AND LOOKS LIKE
	CONTACT B AT BOTH CONNECTORS OF A MULTICONDUCTOR HARNESS CARRYING CIRCUIT 10 FROM THE CONNECTOR AT BASKET DISCONNECT TO CONNECTOR AT MASTER CONTROL PANEL.	
	A BELL CONNECTOR WHICH CONNECTS TO THE TAILLIGHT HARNESS. THE OTHER END IS CONNECTED TO A MULTICONDUCTOR HARNESS CONNECTOR AT THE BULKHEAD DISCONNECT.	
	A SINGLE CONDUCTOR CABLE CARRYING CIRCUIT 2 FROM THE BULKHEAD DISCONNECT TO THE ENGINE DISCONNECT.	
	A CONTINUATION OF THE ABOVE CIRCUIT, ENDING AT THE GENERATOR ASSEMBLY WITH A TERMINAL LUG.	
	A MULTICONDUCTOR HARNESS WITH CIRCUIT 415B HAVING A TIEPOINT (REPRESENTED BY THE DOT). AFTER THE TIE POINT CIRCUIT 415B TERMINATES AT TWO CONTACTS WITHIN THE SAME CONNECTOR.	
	FAULTS WHICH ARE NOT REPAIRABLE AT THE ORGANIZATIONAL LEVEL, INDICATED BY THE BROKEN LINE. THE NON-REPAIRABLE PORTION OF THE DIAGRAM IS INCLUDED TO ASSIST THE TECHNICIAN IN LOCATING THE COMPONENT FOR RETEST AFTER COMPLETING REPAIR ACTION.	

HARNESS CIRCUIT DIAGRAMS (Continued)

THIS DIAGRAM	REPRESENTS	AND LOOKS LIKE
	A MULTICONDUCTOR HARNESS, HAVING A TIE POINT, AFTER WHICH THE CIRCUIT TERMINATES IN TWO DIFFERENT CONNECTORS OF THE SAME HARNESS.	
	A MULTICONDUCTOR HARNESS WITH BELL CONNECTORS AT ONE END AND MULTI-CONTACT CONNECTOR AT THE OTHER END.	

MOST OF THE VEHICLE HARNESSES ARE BRANCHED  AND HAVE MANY CONNECTORS. ONLY THE CONNECTORS ASSOCIATED WITH THE FAULT ARE SHOWN IN THE HARNESS DIAGRAMS CONTAINED IN THE DETAILED TROUBLESHOOTING PROCEDURES. EACH DIAGRAM IS ACCOMPANIED BY AN ILLUSTRATION  (FEMALE SOCKET CONNECTOR) OR  (MALE PIN CONNECTOR) TO ASSIST YOU IN FINDING THE CONTACT ASSOCIATED WITH THE CIRCUIT UNDER TEST. BY NOTING THE LOCATION OF THE KEYWAY  THE CIRCUIT CONTACT UNDER TEST MAY BE EASILY LOCATED.

TROUBLESHOOTING SYSTEM INDEX

TROUBLESHOOTING SUBJECT INDEX

TROUBLESHOOTING SUBJECT INDEX - (Continued)

SUBJECT	SYMPTOM AND RESOURCE TABLE(S) - PAGE	SYMPTOM NUMBER(S)
Gage indicators	4-24, 4-26	15,32-40
Gage instrument panel lamps	4-28	58
Gas particulate	4-28	55,56
Gas particulate indicator lamp	4-27	44
Generator	4-25	31
Headlights	4-29	65-68
Heater, manifold	4-24	8,9
Heater, personnel	4-29	73-76
High beam indicator lamp	4-27	47
Hull drain valve, front	4-28	50
Hull drain valve, rear	4-28	51
Hull power, electrical	4-25	27-30
Hydraulic brakes	4-25	22
Indicators, gage	4-24, 4-26	15, 32-40
Indicators, lamp	4-26	41-47
Light, dust detector warning	4-24.1	16.1-16.11
Light, powerplant warning	4-26	41, 42
Lights, driving	4-28, 4-29	59-69
Lights, gage instrument panel	4-28	58
Lights, indicator	4-26	41-47
Linkage, accelerator	4-24	2
Linkage, brake	4-25	22-24
Linkage, shifting	4-25	20
Linkage, steering	4-25	25, 26
Manifold preheaters	4-24	8,9
Master battery indicator lamp	4-26	43
Motor, air cleaner blower	4-24	12-14
Motor, gas particulate blower	4-28	56
Motor, personnel heater blower	4-29	73, 75
Night vision indicator lamp	4-25	46
Oil consumption, engine	4-24	16
Oil pressure gage, engine	4-26	32
Oil pressure gage, transmission	4-26	34
Oil temperature, engine	4-24	15
Oil temperature gage, engine	4-26	33
Oil temperature, transmission	4-25	21
Oil temperature gage, transmission	4-26	35

TROUBLESHOOTING SUBJECT INDEX - (continued)

VEHICLE OPERATION SYMPTOM AND RESOURCE TABLE

SUBSYSTEM SYMPTOM NO.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED		
			MULTIMETER OR STE/ICE	SPECIAL TOOLS REFERENCE CODE	NO. PERSONNEL
POWERPLANT, STARTING		A	B	C	D
1	Engine will not crank when starter switch is pressed.	4-91	x	*3, 31*	2
2	Engine cranks at normal speed, but will not start (Battery/Generator gage shows in yellow area).	4-118	x		2
3	Engine cranks slowly and will not start.	4-153	x	*3,31*	2
4	Engine starter spins, but will not crank engine.	4-165		*3, 31*	1
5	One electrical fuel pump will not work.	4-168	x	*3, 31*	*2*
6	Both electrical fuel pumps will not work.	4-183	x		1
7	Primer pump will not work.	4-190			2
8	One intake manifold preheater will not work.	4-215	x		2
9	Both intake manifold preheater will not work.	4-222	x		*2*
10	Fuel/Water separator will not work.	4-247	x	*31*	*2*
POWERPLANT, RUNNING					
11	Engine will not run right.	4-258		*31*	2
12	One air cleaner blower fan will not work.	4-280	x		2
13	Both air cleaner blower fans in one air cleaner assembly will not work.	4-285	x		*2*
14	All air cleaner blower fans will not work.	4-289	x		*2*
15	Engine oil temperature gage shows high temperature (PowerPlant warning lamp on).	4-298		*31, 32*	*2*
16	Engine oil level too low (Exceeds 3.5 quarts per hour, while running).	*4-302*		*31*	*2*

VEHICLE OPERATION SYMPTOM AND RESOURCE TABLE

SUBSYSTEM SYMPTOM NO.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED		
			MULTIMETER OR STE/ICE	SPECIAL TOOLS REFERENCE CODE	NO. PERSONNEL
POWERPLANT, RUNNING-CONTINUED		A	B	C	D
16.1	Powerplant warning and dust detector warning lights on, one (or both) dust detector pressure switch(es) tripped, and dust detector filter strip indicates contamination of intake air by dust.	4-306.1			1
16.2	Powerplant warning and dust detector warning lights on, one (or both) dust detector pressure switch(es) tripped, end dust detector filter strip indicates contamination of intake air by fuel.	4-306.4			1
16.3	Powerplant warning and dust detector warning lights on, one (or both) dust detector pressure switch(es) tripped, and dust detector filter strip indicates contamination of intake air by soot.	4-306.6			1
16.4	Powerplant warning and dust detector warning lights on, one (or both) dust detector pressure switch(es) tripped, and dust detector filter strip indicates contamination of intake air by water.	4-306.8			1
16.5	Powerplant warning and dust detector warning lights on. One (or both) dust detector pressure switch(es) tripped, and dust detector filter strip is black and wet, indicating contamination of intake air by oil.	4-306.10			1
16.6	Powerplant warning and dust detector warning lights are on (engine running-all gages read normal).	4-306.11			1

VEHICLE OPERATION SYMPTOM AND RESOURCE TABLE

SUBSYSTEM SYMPTOM NO.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED		
			MULTIMETER OR STE/ICE	SPECIAL TOOLS REFERENCE CODE	NO. PERSONNEL
POWERPLANT, RUNNING - CONTINUED		A	B	C	D
16.7	Powerplant warning and dust detector warning light on, one (or both) dust detector pressure switch(es) tripped, but dust detector filter strip does not indicate contamination of intake air.	4-306.13			1
16.8	Powerplant warning and dust detector warning lights on, but dust detector pressure switch(es) not tripped.	4-306.14	X		1
16.9	Powerplant warning and dust detector warning lights not on. Dust detector pressure switch(es) not tripped. Dust ingestion is apparent by oil sample analysis or dust trails.	4-306.18			1
16.10	Powerplant warning light on, dust detector warning light off, dust detector pressure switch(es) tripped engine running.	4-306.19	X		1
16.11	Dust detector pressure switch(es) tripped, but dust detector warning light and powerplant warning light do not come on when engine is running.	4-306.21	X		1
16.12	Low power, excessive black smoke, one or both filters require frequent cleaning.	4-306.25			1
16.13	Low power, excessive black smoke.	4-306.28			1
POWERPLANT, STOPPING					
17	Engine fuel shutoff switch will not stop engine.	4-307	X		2
18	Manual fuel shutoff handle will not stop engine.	4-319			1
FINAL DRIVE					
19	Final drive leaks oil	4-321			2

VEHICLE OPERATION SYMPTOM AND RESOURCE TABLE - Continued

SUBSYSTEM SYMPTOM NO.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED		
			MULTIMETER OR STE/ICE	SPECIAL TOOLS REFERENCE CODE	NO. PERSONNE
		A	B	C	D
TRANSMISSION					
20	Transmission will not shift properly	4-325		6, 31	2
21	Transmission oil temperature gage shows red (Powerplant warning lamp on).	4-336		6, 31	2
BRAKES					
22	Service brakes will not work right.	4-342		32	2
23	Parking brake will not release.	4-350		32	2
24	Parking brake cannot be applied.	4-353		30, 32	2
STEERING					
25	Vehicle will not steer properly.	4-363			2
26	Vehicle pivots to the left or right.	4-371			2
HULL POWER					
27	No power distribution from master relay (master battery indicator lamp will light).	4-376	X		2
28	No power in vehicle (master battery indicator lamp will not light).	4-386	X		2
29	No power at utility outlet on master control panel.	4-395	X		1
30	No power at slave receptacle (master battery lamp lights).	4-397	X		1
GENERATOR/REGULATOR					
31	300 amp Generator/regulator system is not working.	4-399	X	4,31	2
31.1	650 amp alternator/regulating system is not working	4-414.2	X	129	2

INDICATOR SYMPTOM AND RESOURCE TABLE

SUBSYSTEM SYMPTOM NO.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED		
			MULTIMETER OR STE/ICE	SPECIAL TOOLS REFERENCE CODE	NO. PERSONNEL
GAGE		A	B	C	D
32	Engine oil pressure gage will not show pressure (Powerplant warning lamp not on- all other gages read normal).	4-416	**X**		2
33	Engine oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal).	4-429	X		2
34	Transmission oil pressure gage shows no pressure (Engine running - all other gages read normal).	4-442	**X**	31	2
35	Transmission oil temperature gage shows high or no temperature (Powerplant warning lamp not on - engine running - all other gages read normal).	4-458	X	31	2
36	Battery/Generator gage will not work (all other gages work).	4-475	X		1
37	Battery/generator gage pointer in right red area,	4-476	**X**		1
38	Battery/generator gage pointer in yellow or left red area (Engine running).	4-477	**X**		2
39	Fuel level gage will not work (all other gages work).	4-479	**X**		2
40	All gages on gage instrument panel will not work (Engine running).	4-493	**X**		1
LAMP					
41	Powerplant warning lamp will not come on (Engine not running).	4-498	X		2
42	Powerplant warning lamp on (Engine running - all gages read normal).	4-505	X	31	2
43	Master battery indicator lamp will not light (There is power in vehicle).	4-513	**X**		1
44	Gas particulate indicator lamp will not light (Gas particulate blower works).	4-514	**X**		1
45	Personnel heater indicator lamp will not light (Personnel heater works).	4-515	**X**		1
46	Night vision indicator lamp will not light (IR periscopes will work).	4-520	X		1

INDICATOR SYMPTOM AND RESOURCE TABLE - Continued

SUBSYSTEM SYMPTOM NO.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED: MULTIMETER OR STE/ICE	RESOURCES REQUIRED: SPECIAL TOOLS REFERENCE CODE	RESOURCES REQUIRED: NO. PERSONNEL
LAMP		A	B	C	D
47	High beam indicator lamp will not light when white service and/or B.O. service high beam lamps are on.	4-521	X		2
48	Smoke generator indicator lamp will not light (Smoke generator will make smoke).	4-531	X		1

SUPPORT SYSTEM SYMPTOM AND RESOURCE TABLE

SUBSYSTEM SYMPTOM NO.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED: MULTIMETER OR STE/ICE	RESOURCES REQUIRED: SPECIAL TOOLS REFERENCE CODE	NO. PERSONNEL
COMMUNICATIONS		A	B	C	D
49	Static or whining noise in radio (Electromagnetic interference EMI).	1-533			2
DRAIN VALVE					
50	Front drain valve will not work.	4-552			1
51	Rear drain valve will not work.	4-553			2
FIRE EXTINGUISHER					
52	Fixed fire extinguisher fails to operate when FIRE PULL HARD handle is pulled.	4-558			2
53	Fixed fire extinguisher fails to operate when exterior first shot or second shot handles are pulled.	4-564			2
54	Engine does not stop running when FIRE PULL HARD handle is pulled (Engine fuel shutoff switch on master control panel will work).	4-572	X		1
GAS PARTICULATE					
55	Gas particulate hose will not deliver sufficient airflow.	4-583			2
56	Gas particulate blower motor will not run.	4-585	X		2
VEHICLE LIGHTING (INTERNAL)					
57	Operator's domelight will not light.	4-593	X		1
58	Gage instrument panel lamps will not light (Panel light switch at BRIGHT).	4-597	X		2
VEHICLE LIGHTING (EXTERNAL)					
59	Lights controlled by lighting control switch will not light (panel switch at OFF, BRIGHT or DIM).	4-603	X		1
60	Panel and drive lights are very dim or will not light, with panel light switch at BRIGHT, DIM or PARK (Lights are OK with panel light switch at OFF).	4-607	X		2
61	Service stoplight will not light.	4-613	X		

SUPPOR T SYSTEM SYMPTOM AND RESOURCE TABLE - Continued

SUBSYSTEM SYMPTOM No.	SYMPTOM TITLE	PAGE	RESOURCES REQUIRED		
			MULTIMETER OR STE/ICE	SPECIAL TOOLS REFERENCE CODE	NO. PERSONNEL
VEHICLE LIGHTING (EXTERNAL)-Continued		A	B	C	D
62	Blackout stoplight will not light.	4-622	X		2
63	Blackout drive lamp will not light (IR service lamps will light).	4-630	X		2
64	Both blackout taillights and/or both blackout marker lights will not light.	4-635	X		2
65	One headlight blackout marker lamp or one taillight blackout marker lamp will not light.	4-641	X		2
66	High beam or low beam, in one service headlight lamp, will not light or service taillight will not light (Panel light switch at BRIGHT, DIM or OFF).	4-645	X		2
67	Both high beam and/or both low beam service lamps will not light (Dimmer switch in either position).	4-656	X		2
68	Both high beam or low beam IR lamps will not light.	4-664	X		1
69	IR lamps will not light.	4-668	X		2
PERISCOPES					
70	IR periscopes will not work (Night vision indicator lamp will not light)	4-682	X		1
71	IR periscopes will not work (Night vision indicator lamp will light).	4-686	X		2
72	Operator's IR periscope will not work.	4-689	X		2
PERSONNEL HEATER					
73	No heat from personnel heater.	4-693	X		2
74	Personnel heater HI/LO switch will not control heater (Blower runs in one or both ON-HI, ON-LO switch positions).	4-711	X		2
75	Personnel heater starts, works for a short time, then stops.	4-724			2
76	Exhaust fumes from personnel heater inside vehicle.	4-727			2
SMOKE GENERATOR					
77	Smoke generator will not work (No smoke or quantity of smoke is not normal).	4-729	X		2
SMOKE GRENADE LAUNCHER					
78	Grenade launcher fails to fire (Grenade Power lamp fails to light)	4-743	X		2

USE OF DIGITAL MULTIMETER

Multimeters AN/URM-105 or ME-77 C/U pictured throughout this TM are no longer used. Use digital multimeter that is part of your tool set to troubleshoot the M60A1 AVLB vehicle.

1 **If a troubleshooting procedure reads one of the following instructions, set your multimeter as**

- "Check if meter indicates continuity"
  Use the lowest range on the multimeter
- "Check if meter indicates a short"
  Use the lowest range on the multimeter
- "Check if meter indicates infinity"
  Use the highest range on the multimeter
- "Set multimeter to OHMS X! scale and zero meter"
  Use the lowest range on the multimeter

STANDARD TROUBLESHOOTING PRACTICES

1

- Be sure master power is off before connecting or disconnecting any electrical cable or harness unless otherwise specified.
- Anytime a connector is disconnected it should be checked for cleanliness and broken, bent, or pushed in pins. If you find missing or damaged pins, notify your supervisor.
- When instructed to make a measurement to chassis ground, ensure you make solid contact to metal surface, free of paint, grease and dirt. Connector backshells (not the coupling ring) and braided wire ground straps are reliable chassis connections.
- If testing for an intermittent condition, flex the harness and test for a reading that varies above or below the limits specified in test block.
- Continuity is defined as a 0 to 5 ohms reading on a multimeter. A buzzer or light can give a false continuity or short circuit indication when the circuit resistance is actually greater than 5 ohms. Do not use a buzzer or light without verifying the actual multimeter reading.
- The new cables and harnesses are covered by heat shrink tube so the circuit (CKT) numbers cannot be seen. Cables and harnesses are labeled with part number and the connector ends are labeled with all CKT numbers at that specific connector.

All data on page 4-32 thru 4-45 deleted

SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION ENGINE (STE/ICE) SET

USE OF SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION ENGINE (STE/ICE) SET.

1 **Locate SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION ENGINE (STE/ICE) TEST PROCEDURE TABLE.**

- Turn to TEST PROCEDURES TABLE (page 4-51).
- This table lists all the STE/ICE tests used in this manual.

Have you located the table listing the test procedures?

YES — NO

2 **Determine STE/ICE test to be performed.**

- Determine number or title of test to be performed from either.
- TROUBLESHOOTING procedure.
- PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS).
- Locate the proper test number in column A or test title in column B of TABLE (page 4-51).

Has test number or test title been located in TABLE ?

YES — NO

3 **Notify your supervisor.**

4 **Notify your supervisor.**

SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION ENGINE (STE/ICE) SET (Continued)

TEST PROCEDURES TABLE

Column A TEST NUMBER	Column B TITLE	Column C PAGE NUMBER
Test 13	CI Power Test	4-76
Test 14	Compression Unbalance Test	4-86
Test 50	Pressure 0-1000 PSIG Test	4-88
Test 66/60	VTM General Set-Up Confidence and Identification Test	4-55
Test 67	Charging Circuit and Battery Voltage Test	4-67
Test 72	Starter Current First Peak Test	4-70
Test 74	Starter Circuit Resistence Test	4-73
Test 77/79	Battery Condition Test	4-60
Test 89	DC Voltage Test	4-81
Test 91/92	Resistance and Continuity Test	4-83

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SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION ENGINE (STE/ICE) SET (Continued)

5 **Locate page number of STE/ICE test to be performed.**

- Once either TEST NO., column A or test TITLE column B is known, locate Page number in column C.
- Turn to page number indicated in column C, on this page you will find a procedure of how to perform
  (1) the desired STE/ICE test and,
  (2) the desired test results.

Have you located the page number of the STE/ICE test to be performed?

TEST PROCEDURES TABLE		
Column A	Column B	Column C
TEST NUMBER	TITLE	PAGE NUMBER
Test 13	CI Power Test	4-76
Test 14	Compression Unbalance Test	4-86
Test 50	Pressure 0-1000 PSIG Test	4-88
Test 66/60	VTM General Set-Up Confidence and Identification Test	4-55
Test 67	Charging Circuit and Battery Voltage Test	4-67
Test 72	Starter Current First Peak Test	4-70
Test 74	Starter Circuit Resistence Test	4-73
Test 77/79	Battery Condition Test	4-60
Test 89	DC Voltage Test	4-81
Test 91/92	Resistance and Continuity Test	4-83

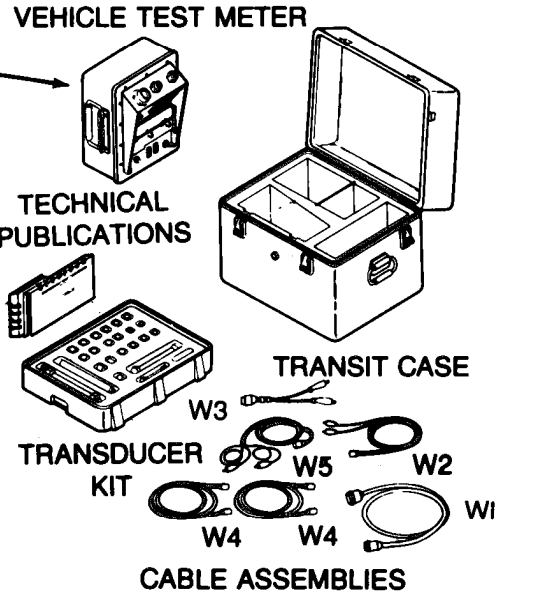
YES / NO

6 **Notify your supervisor.**

7 **Get to know your STE/ICE System.**

- Check if the following STE/ICE system items are available.
- Vehicle Test Meter (VTM).
- Transducer kit.
- Cable assemblies W1 (1 each), W2 (1 each), W3 (1 each), W4 (2 each), and W5 (1 each).
- Technical publications.
- Transit case.

Are all STE/ICE system items available?



SIMPLIFIED TEST EQUIPMENT INTERNAL COMBUSTION ENGINE (STE/ICE) SYSTEM

TA249932

SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION ENGINE (STE/ICE) SET (Continued)

YES

NO

8 **Identify and become familiar with Vehicle Test Meter (VTM) controls, indicators and connectors.**

- POWER SWITCH (PUSH ON/PULL OFF). Controls power to the VTM. When POWER SWITCH is pushed in (PUSH ON), the VTM power is on. When POWER SWITCH is pulled out (PULL OFF) the VTM power is off.
- TEST SELECT SWITCHES. Each switch has 10 positions, 0 through 9. Test to be performed is to be dialed into these switches.
- TEST BUTTON. Depressing and releasing the TEST BUTTON causes the test measurement to begin.
- READOUT DISPLAY. This contains up to a four character readout. STE/ICE test procedure being performed will explain readout.
- FLIP CARDS. Lists the two digit test number system for selecting various tests.
- POWER/DCA CONNECTOR J1. Used with power cable W5 to connect the VTM to a power source.
- TRANSDUCER CABLE CONNECTORS J2 AND J3. Used with transducer cables W4 to connect VTM to any transducer in the transducer kit. Connectors J2 and J3 are identical and can be interchanged with each other or used in combination.
- TEST PROBE CABLE CONNECTOR J4. Connects test lead to the VTM when doing voltage or resistance tests.

Are you familiar with VTM controls, indicators and connectors?

YES

NO

9 **Check desired STE/ICE test procedure for cables, transducers and fittings required to perform test.**

- Check that cables, transducers and fittings required to perform STE/ICE tests are available.

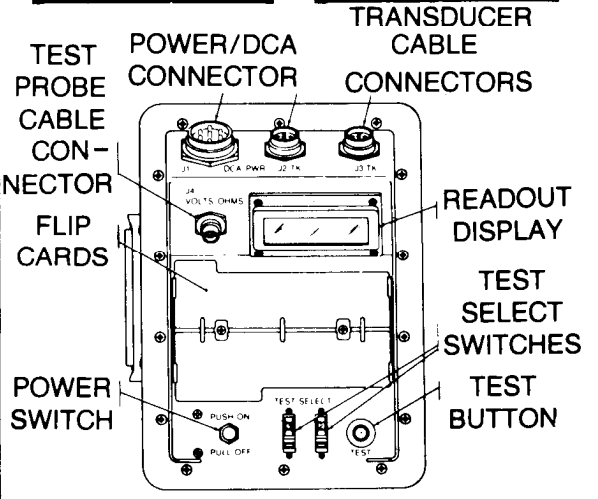
Are all parts required to perform STE/ICE test available?

YES

NO

10 **Go to Step (9)**

11 **Notify your supervisor.**



VTM CONTROLS AND READOUT DISPLAY

12 **Notify your supervisor.**

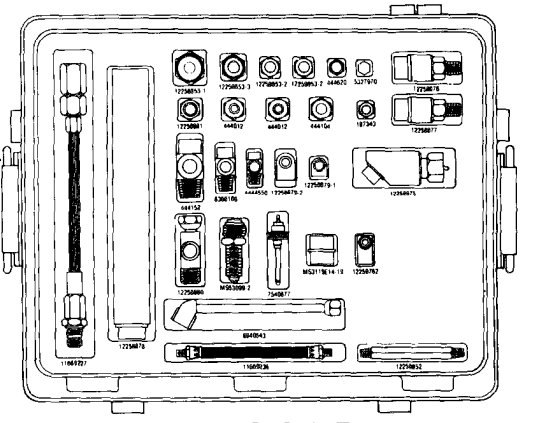
TA249933

SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION ENGINE (STE/ICE) SET (Continued)

13 **Identify and become familiar with items in the Transducer Kit required for STE/ICE test to be performed.**

- Check component list (page 4-52) for listing of items found in Transducer kit.
- Make sure all Transducer kit items that are necessary to perform desired STE/ICE test are available.

Are you familiar with Transducer kit and are all items required for STE/ICE test available?



TRANSDUCER KIT

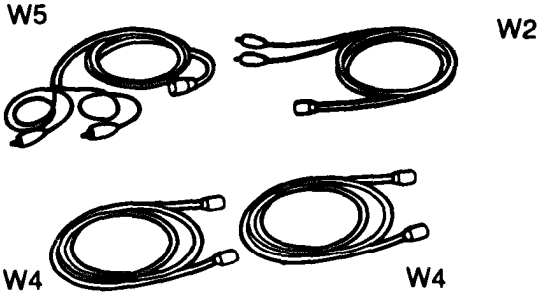
YES — NO

14 **Notify your supervisor.**

15 **Identify and become familiar with the cable assemblies required for STE/ICE test to be performed.**

- Test Probe Cable W2, to be connected to VTM connector J4 if required for test.
- Transducer Cables W4 (2 each), to be connected to VTM connector J2 or J3. Cables W4 may be joined together with adapter MS3119E-14-19 supplied in transducer kit, to make one long cable.
- Power Cable W5, to be connected to VTM connector J1 to supply power to the VTM.

Are you familiar with cable assemblies and are all cable assemblies required for STE/ICE test available?



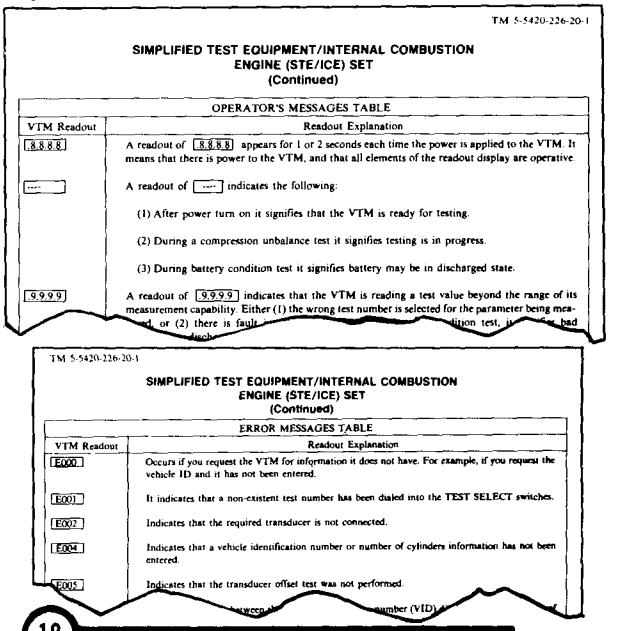
CABLE ASSEMBLIES

YES — NO

16 **Notify your supervisor.**

TA249934

SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION ENGINE (STE/ICE) SET (Continued)



TM 5-5420-226-20-1

SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION ENGINE (STE/ICE) SET (Continued)

OPERATOR'S MESSAGES TABLE

VTM Readout	Readout Explanation
8.8.8.8	A readout of 8.8.8.8 appears for 1 or 2 seconds each time the power is applied to the VTM. It means that there is power to the VTM, and that all elements of the readout display are operative.
----	A readout of ---- indicates the following: (1) After power turn on it signifies that the VTM is ready for testing. (2) During a compression unbalance test it signifies testing is in progress. (3) During battery condition test it signifies battery may be in discharged state.
9.9.9.9	A readout of 9.9.9.9 indicates that the VTM is reading a test value beyond the range of its measurement capability. Either (1) the wrong test number is selected for the parameter being mea- ..., or (2) there is fault ... dition test, it ... had ...

TM 5-5420-226-20-1

SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION ENGINE (STE/ICE) SET (Continued)

ERROR MESSAGES TABLE

VTM Readout	Readout Explanation
E000	Occurs if you request the VTM for information it does not have. For example, if you request the vehicle ID and it has not been entered.
E001	It indicates that a non-existent test number has been dialed into the TEST SELECT switches.
E002	Indicates that the required transducer is not connected.
E004	Indicates that a vehicle identification number or number of cylinders information has not been entered.
E005	Indicates that the transducer offset test was not performed.

17 **While performing test, an OPERATOR'S MESSAGES or ERROR MESSAGES may appear on VTM display. Locate OPERATOR'S MESSAGES and ERROR MESSAGES TABLES.**

- Turn to OPERATOR'S MESSAGE TABLE (page 4-53) for meaning of OPERATOR'S MESSAGE if displayed on VTM readout display.
- Turn to ERROR MESSAGE TABLE (page 4-54) for meaning of ERROR MESSAGE if displayed on VTM readout display.

Have you located the TABLE that gives the meaning of OPERATOR'S MESSAGES or ERROR MESSAGES?

YES — NO

18 **Notify your supervisor.**

19 **Locate the readout shown on the VTM display in OPERATOR'S MESSAGE TABLE or ERROR MESSAGE TABLE.**

- Check OPERATOR'S MESSAGE TABLE (page 4-53) for OPERATOR'S MESSAGE readout shown on VTM display.
- Check ERROR MESSAGE TABLE (page 4-54 for ERROR MESSAGE readout shown on VTM display.

Did you locate the readout shown on VTM display in either table?

YES — NO

21 **Continue with STE/ICE test to be performed.**

20 **Notify your supervisor.**

TA249935

SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION ENGINE (STE/ICE) SET (Continued)

TEST PROCEDURES TABLE

Column A	Column B	Column C
TEST NUMBER	TITLE	PAGE NUMBER
Test 13	CI Power Test	4-76
Test 14	Compression Unbalance Test	4-86
Test 50	Pressure 0-1000 PSIG Test	4-88
Test 66/60	VTM General Set-Up Confidence and Identification Test	4-55
Test 67	Charging Circuit and Battery Voltage Test	4-67
Test 72	Starter Current First Peak Test	4-70
Test 74	Starter Circuit Resistance Test	4-73
Test 77/79	Battery Condition Test	4-60
Test 89	DC Voltage Test	4-81
	Resistance and Continuity Test	4-83

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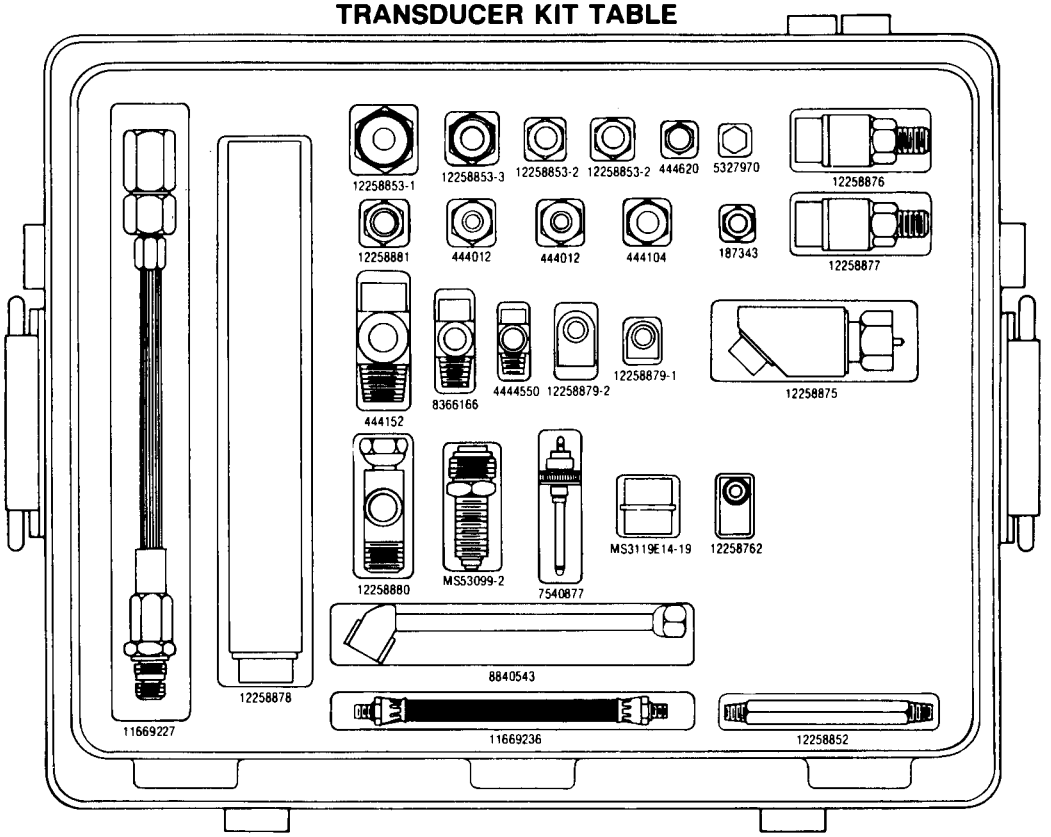
SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION ENGINE (STE/ICE) SET
(Continued)
TRANSDUCER KIT TABLE



Part Number	Qty	Item
187343	1	Male Connector,5/16 tube to 1/4 MPT
444012	2	Adapter, 1/8 MPT to 1/4 FPT
444104	1	Coupling Reducer, 1/8 FPT to 1/4 FPT
444550	1	Street Tee, 1/8 pipe thread
444152	1	Street Tee, 1/2 pipe thread
444620	1	Hex Head Plug, 1/4 MPT
7540877	1	Ignition Adapter
8366166	1	Street Tee, 1/4 pipe thread
8840543	1	Air Chuck
5327970	1	Hex Head Plug, 1/8 MPT
11669227	1	Hose & Fitting Ass''y. (Spark Plug Adapter)
11669236	1	Hose Assembly, 1/8 MPT
12258762	1	Tee, Inverted Flare
12258852	1	Pipe Nipple, 1/8 MPT
12258853-1	1	Pipe Thread Reducer, 3/4 MPT to 1/4 FPT
12258853-2	2	Pipe Thread Reducer, 3/8 MPT to 1/4 FPT
12258853-3	1	Pipe Thread Reducer, 1/2 MPT to 1/4 FPT
12258875	1	Pulse Tachometer
12258876	1	Pressure Transducer, 0-1000 PSI
12258877	1	Pressure Transducer, -30 in. Hg to 25 PSIG
12258878	1	Current Probe
12258879-1	1	Street Elbow, 1/8 pipe thread
12258879-2	1	Street Elbow, 1/4 pipe thread
12258880	1	Fuel Line Adapter
12258881	1	Snubber
MS53099-2	1	Tachometer Drive Adapter
MS3119E14-19	1	Adapter (connector-to-connector)

TA249937

SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION ENGINE (STE/ICE) SET (Continued)

OPERATOR'S MESSAGES TABLE	
VTM Readout	Readout Explanation
[.8.8.8.8]	A readout of [.8.8.8.8] appears for 1 or 2 seconds each time the power is applied to the VTM. It means that there is power to the VTM, and that all elements of the readout display are operative.
[----]	A readout of [----] indicates the following: (1) After power turn on it signifies that the VTM is ready for testing. (2) During a compression unbalance test it signifies testing is in progress. (3) During battery condition test it signifies battery may be in discharged state.
[.9.9.9.9]	A readout of [.9.9.9.9] indicates that the VTM is reading a test value beyond the range of its measurement capability. Either (1) the wrong test number is selected for the parameter being measured, or (2) there is fault in the vehicle, (3) during battery condition test, it signifies bad connections, discharged, or bad batteries.
[PASS] [FAIL]	A PASS or FAIL readout is the result of a test that checks the condition of a component being measured. A [PASS/FAIL] readout means just that - the component either passes the test or fails the test.
[UEH]	Signal to technician to enter vehicle type identification number (VID) on the TEST SELECT switches. Vehicle ID numbers are found under TEST DATA on the flip cards, on the vehicle test cards.
[GO]	Signal to technician to crank engine in compression balance or first peak tests. During battery condition test, indicates weak battery in series pair of batteries being tested.
[CIP]	Signal to technician to apply full throttle in a CI power test.
[OFF]	Signal to technician to stop cranking in compression balance test or to release the accelerator in the CI power test.
[CAL]	Signal to the technician to release the TEST button during an offset test.
[66]	Numbers are used for prompting messages in several tests. They are as follows: in confidence test 66 signals the technician to dial in "99"; in CI acceleration/deceleration power test No. 12, the first numerical readout signals the technician to shut off fuel.

TA249938

SIMPLIFIED TEST EQUIPMENT/INTERNAL COMBUSTION ENGINE (STE/ICE) SET (Continued)

ERROR MESSAGES TABLE	
VTM Readout	Readout Explanation
E000	Occurs if you request the VTM for information it does not have. For example, if you request the vehicle ID and it has not been entered.
E001	It indicates that a non-existent test number has been dialed into the TEST SELECT switches.
E002	Indicates that the required transducer is not connected.
E004	Indicates that a vehicle identification number or number of cylinders information has not been entered.
E005	Indicates that the transducer offset test was not performed.
E007	Indicates a conflict between the vehicle identification number (VID) dialed in and the number of cylinders dialed in. It may occur in response to either VID entry or number-of-cylinders entry.
E008	Indicates the VTM is not receiving the required voltage signal for the test selected. This error is related only to starter and compression balance tests.
E011	Indicates that the throttle control was operated incorrectly during power test taking too much time to either accelerate or decelerate.
E012	Indicates that the CI plus tachometer is missing.
E013	Indicates bad data were taken for the test in progress. Repeat the test one (1) time.
E018	Indicates that an engine rpm or ac frequency test was terminated automatically to protect the VTM. Termination is only after several minutes of no-signal operation. Most likely the VTM was left on the vehicle and the engine stalled.

TA249939

VTM GENERAL SET UP, CONFIDENCE AND IDENTIFICATION TEST 66/60

CAUTION

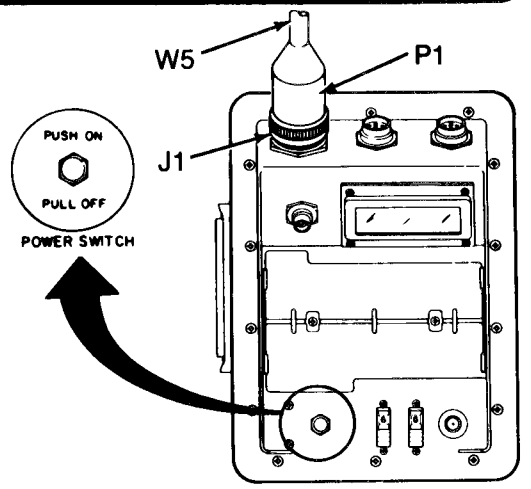
Do not connect or disconnect VTM while vehicle engine is running.

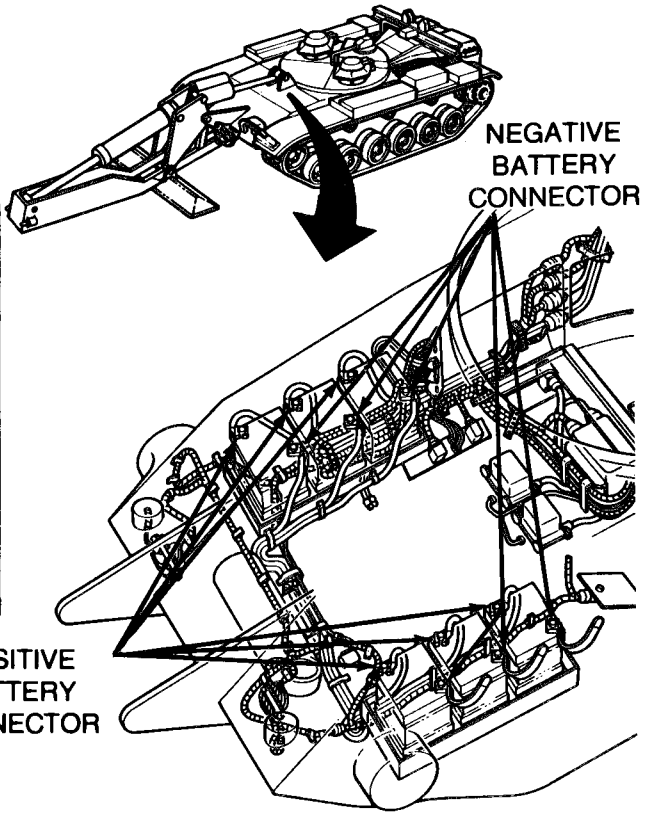
CAUTION

Connect P1 of power cable W5 to J1 of VTM before connecting clip leads to battery cable.

CAUTION

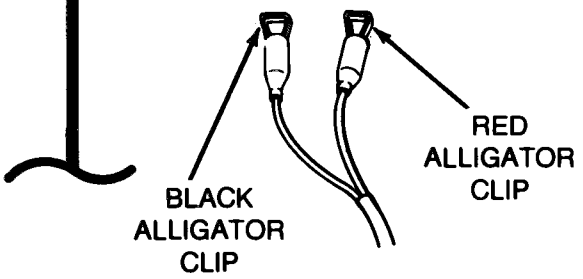
Observe polarity. Make sure red alligator clip of power cable W5 connects to positive (+) connector on battery and black alligator clip of power cable W5 connects to negative (–) on battery.





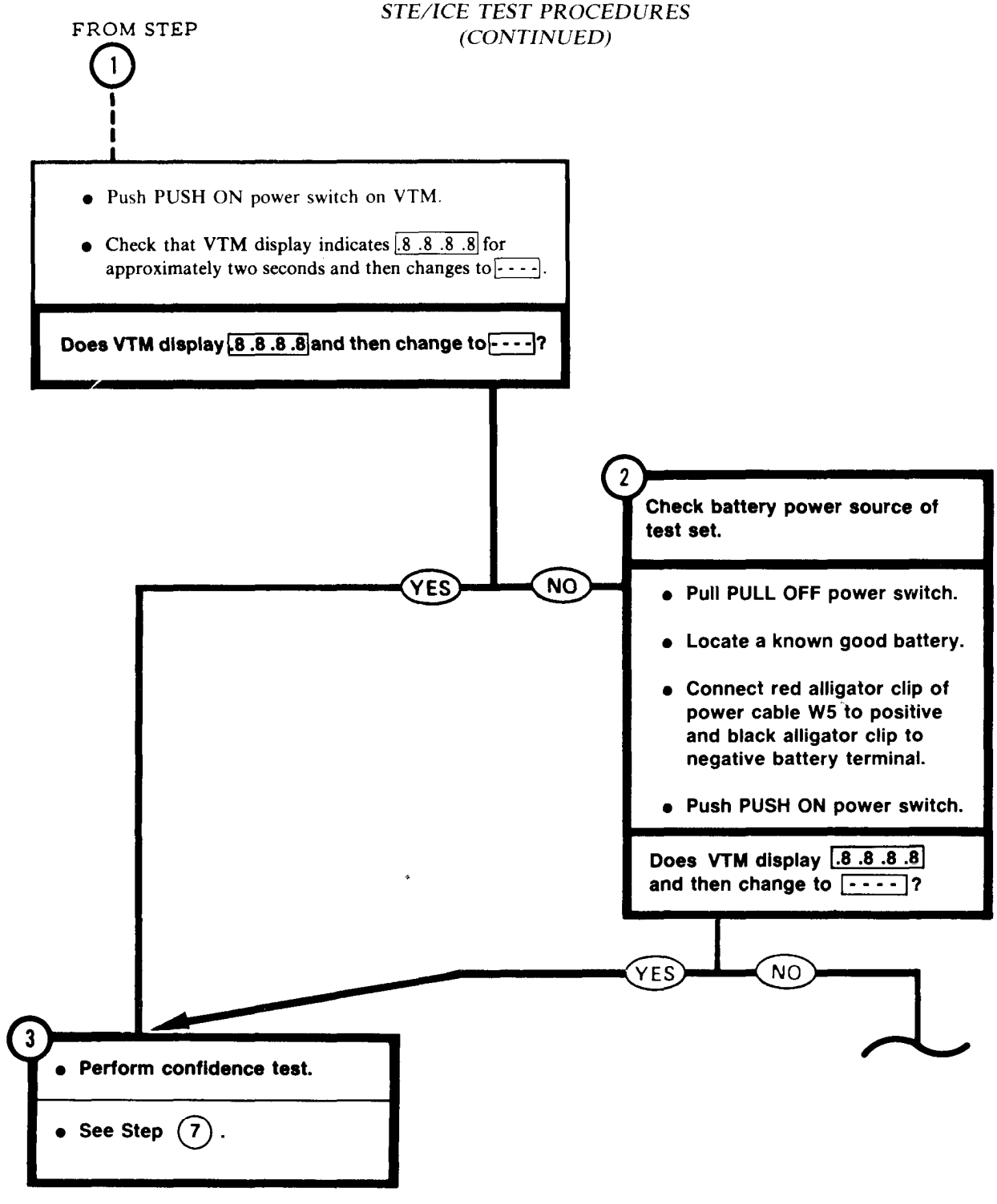
1 VTM general set up.

- Pull PULL OFF power switch on VTM.
- Connect P1 of power cable W5 to J1 on VTM.
- Connect red alligator clip of power cable W5 to positive (+) connector on battery.
- Connect black alligator clip of power cable W5 to negative (–) connector on battery.



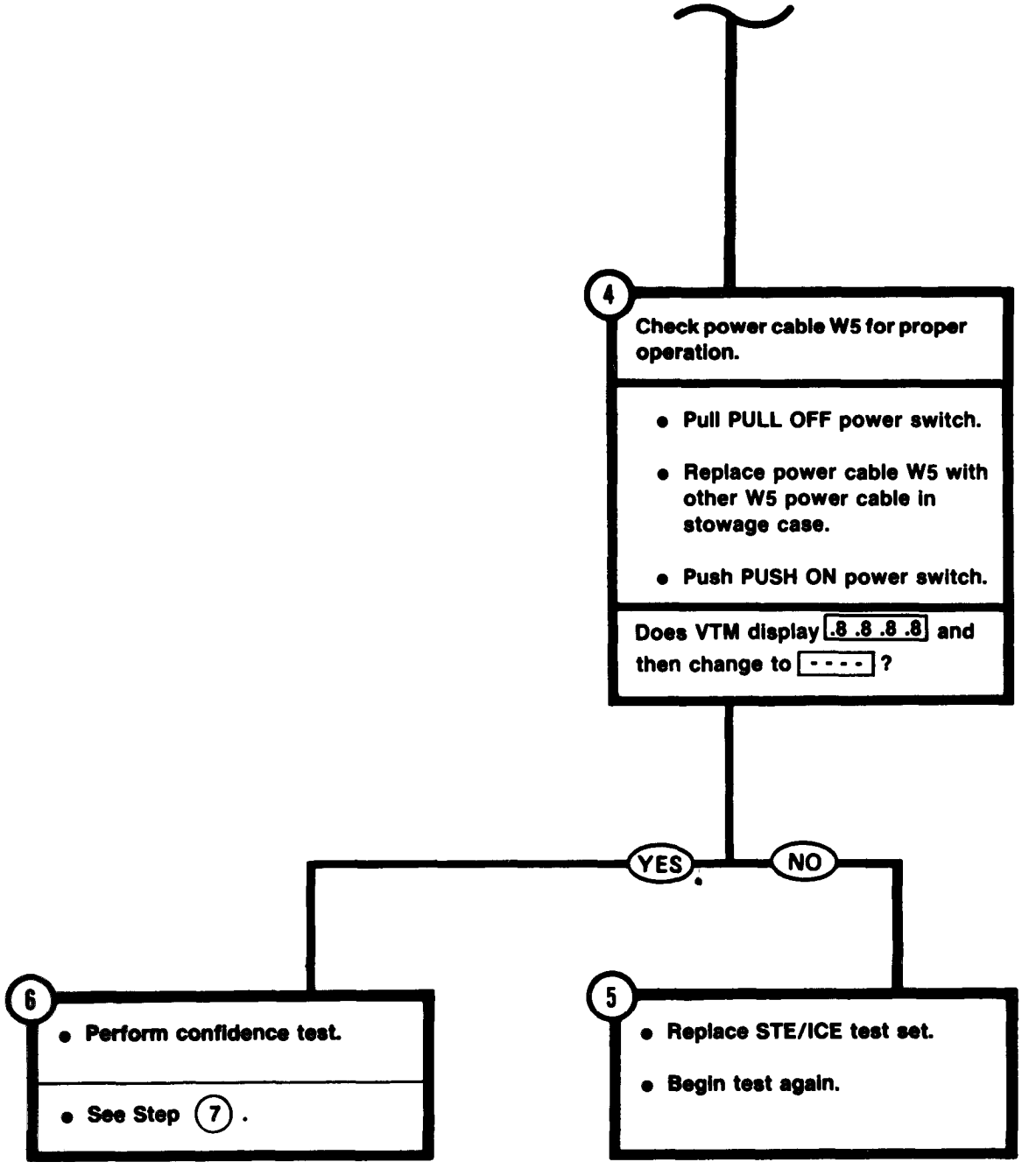
TA249940

STE/ICE TEST PROCEDURES
(CONTINUED)



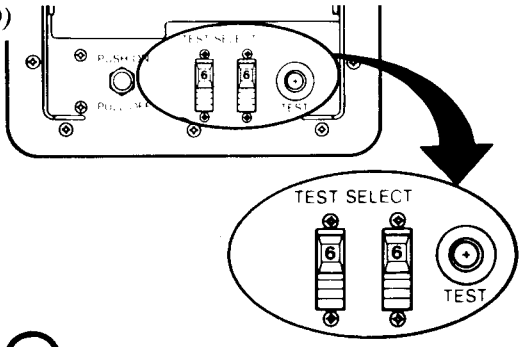
TA249941

STE/ICE TEST PROCEDURES
(CONTINUED)



TA249942

STE/ICE TEST PROCEDURES
(CONTINUED)



7 Confidence Test

- Dial TEST SELECT switches to 66.
- Press and release TEST button.
- Check that VTM display indicates [0066] and holds.

Does VTM display and hold [0066]?

YES — NO

8 Re-dial 66 and press TEST button.

Does VTM display indicate and hold [0066]?

YES — NO

9 Replace STE/ICE set.

10

- Dial TEST SELECT switches to 99.
- Check that several numbers appear on VTM display, [99], [.8 .8 .8 .8] and others.
- Wait for VTM display to indicate [PASS].

Does VTM display [PASS]?

YES — NO

NOTE

The VTM can fail the Confidence Test if a bad transducer is connected to it. If the VTM fails, the Confidence Test when powered by W5, (TK power cable), disconnect all cables from J2, J3 and J4 and try again. If it passes, one of the transducers is bad. If it fails, the VTM has failed internally.

11

- **Repeat Confidence Test.**
- **Wait for VTM display to indicate [PASS].**

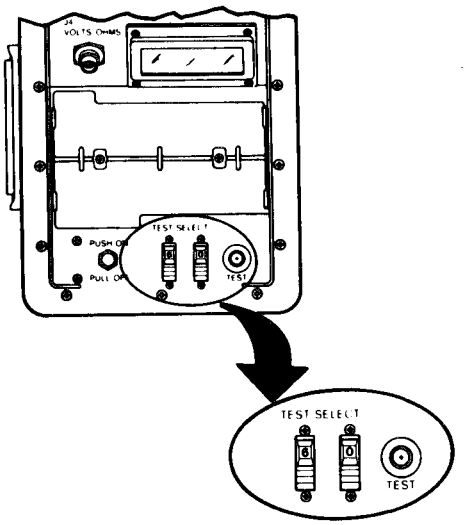
Does VTM display indicate [PASS]?

YES — NO

12 Replace STE/ICE set.

TA249943

STE/ICE TEST PROCEDURES
(CONTINUED)



13 **Enter vehicle identification (VID) number.**

- Dial TEST SELECT switches to 60.
- Press and release TEST button.
- VTM display will indicate [UEH].
- Dial TEST SELECT switches to [4].
- Press and release TEST button.
- Check that VTM display indicates [4].

Does VTM display indicate [4]?

YES → **16** **Proceed with STE/ICE test.**

NO → **14**

- **Repeat test.**
- **Check that VTM display indicates [4].**

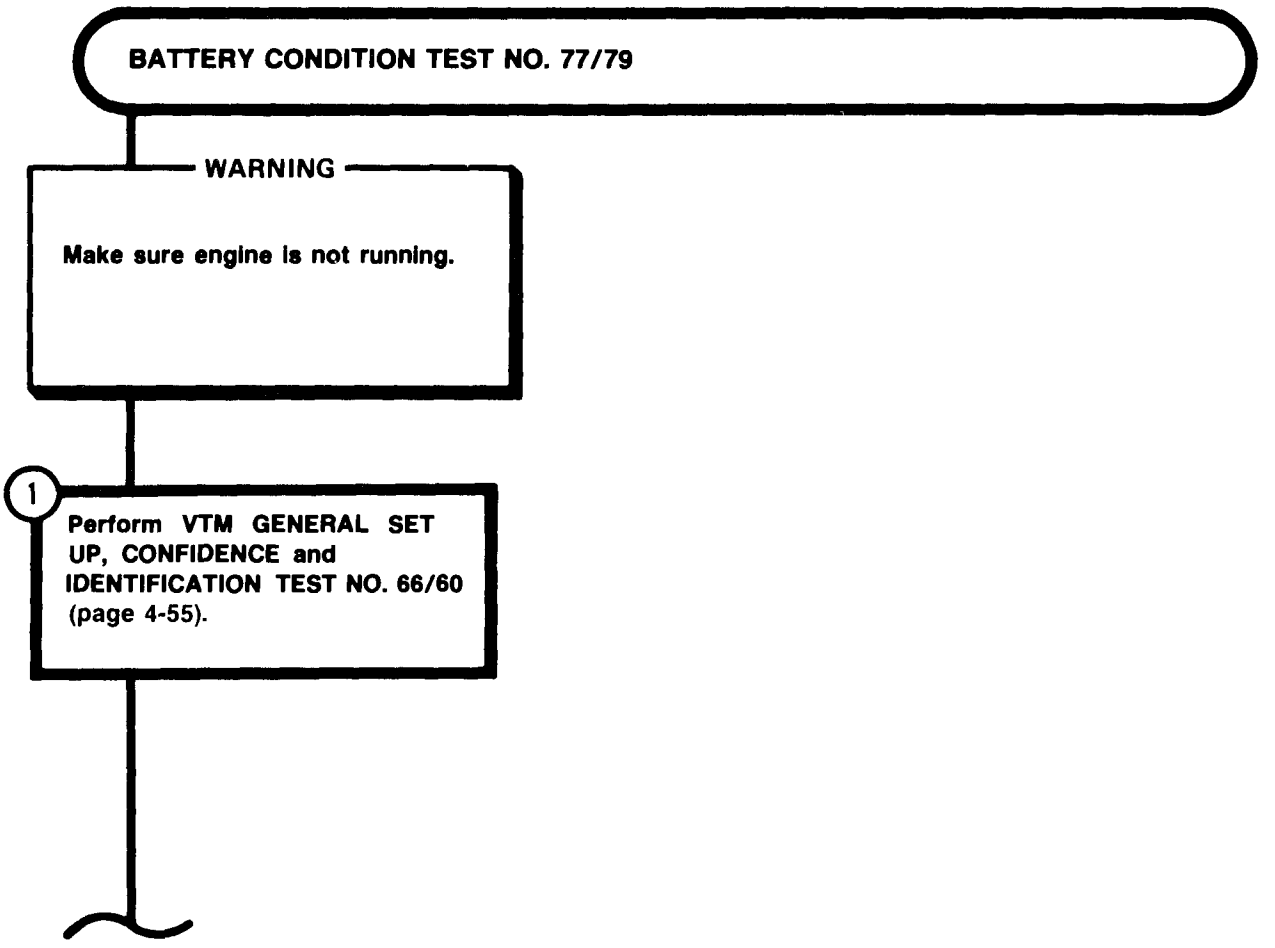
Does VTM display indicate [4]?

YES → **16** **Proceed with STE/ICE test.**

NO → **15** **Replace STE/ICE set.**

TA249944

STE/ICE TEST PROCEDURES
(CONTINUED)



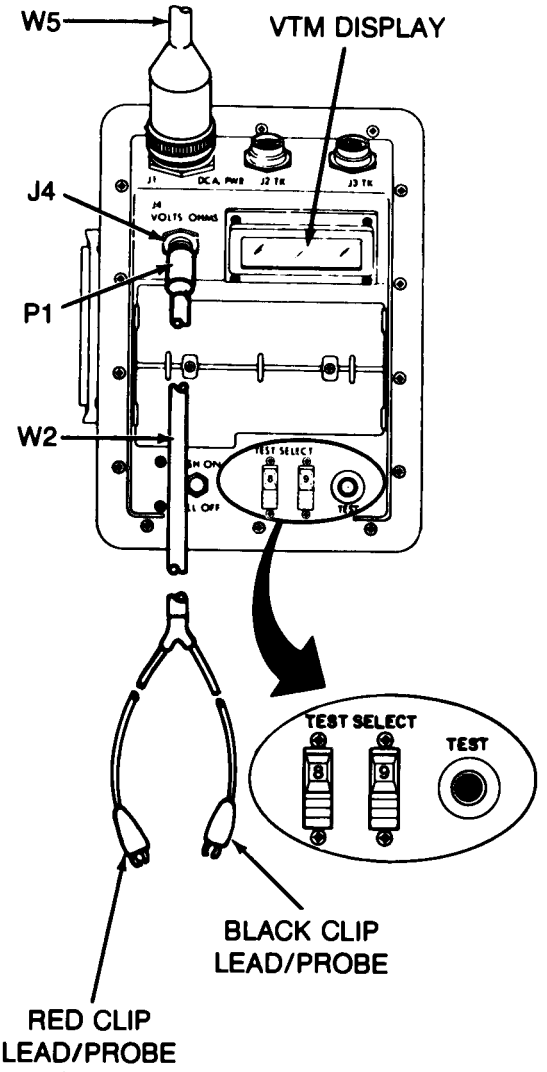
TA249945

STE/ICE TEST PROCEDURES
(CONTINUED)

2 **Connect test probe cable to VTM, do OFFSET test.**

- Connect P1 of test probe cable W2 to J4 of VTM.
- Connect red and black clip leads/probes of cable W2 together.
- Dial TEST SELECT switches to 89.
- Press TEST button and hold until VTM display indicates [CAL].
- Release TEST button.
- Check that offset measurement on VTM display indicates between [-6.8] to [+6.8].

Does VTM display indicate between [-6.8] to [+6.8]?



YES

NO

3 **Replace STE/ICE set.**

TA249946

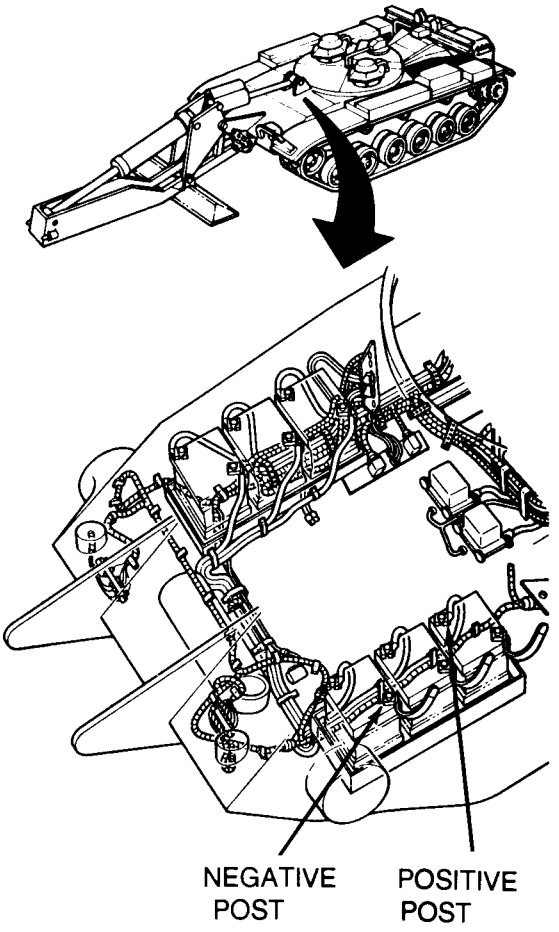
STE/ICE TEST PROCEDURES
(CONTINUED)

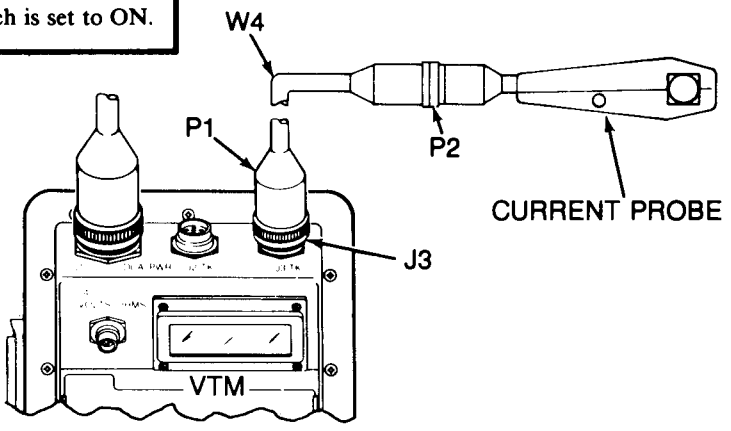
4 **Installation of clip leads/probes of cable W-2.**

- Connect red clip lead/probe to positive (+) post on battery being tested.
- Connect black clip lead/probe to negative (-) terminal on battery being tested.

5 **Condition current probe - Do OFFSET.**

- Connect P1 of transducer cable W4 to J3 on VTM.
- Connect P2 of transducer cable W4 to connector on current probe.
- Clamp current probe around battery cable which connects series pair of batteries containing battery to be tested. Make sure current probe arrow is pointing toward negative-terminal.
- Make sure MASTER BATTERY switch is set to ON.





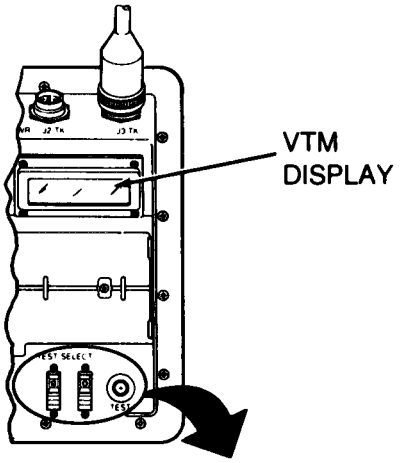
TA249947

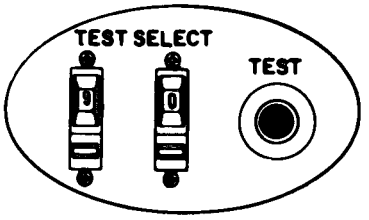
STE/ICE TEST PROCEDURES
(CONTINUED)

FROM STEP 5

- Hold ENGINE FUEL SHUT OFF switch up and crank engine for 3 seconds by pressing STARTER switch.
- Set MASTER BATTERY switch to OFF.
- Make sure HEATER MASTER circuit breaker is set to OFF.
- Dial TEST SELECT switches to 90.
- Press TEST button and hold until VTM display indicates CAL.
- Release TEST button.
- Check that offset measurement on VTM display indicates between -225 to +225

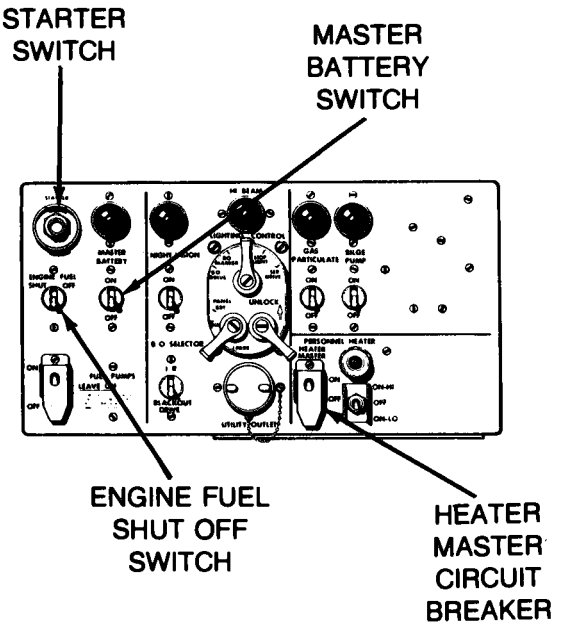
Does VTM display indicate between -225 to +225 ?





NO → 6 **Perform OFFSET Fault Isolation (TM 9-4910-571-12 & P).**

YES



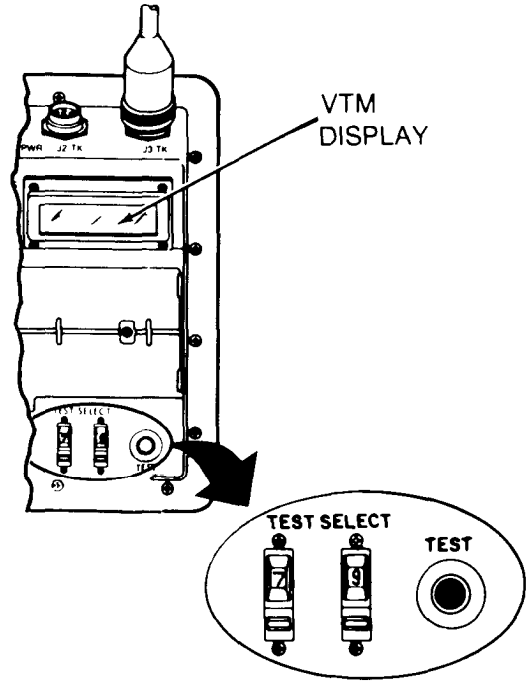
TA249948

STE/ICE TEST PROCEDURES
(CONTINUED)

7 **Measure battery resistance change.**

- Dial TEST SELECT switches to 79.
- Press and release TEST button.
- Check that VTM display indicates GO.

Does VTM display indicate GO ?



YES

NO

8

- **VTM display indicates an error code. See error readouts (page 4-54).**
- **Correct error and retest.**

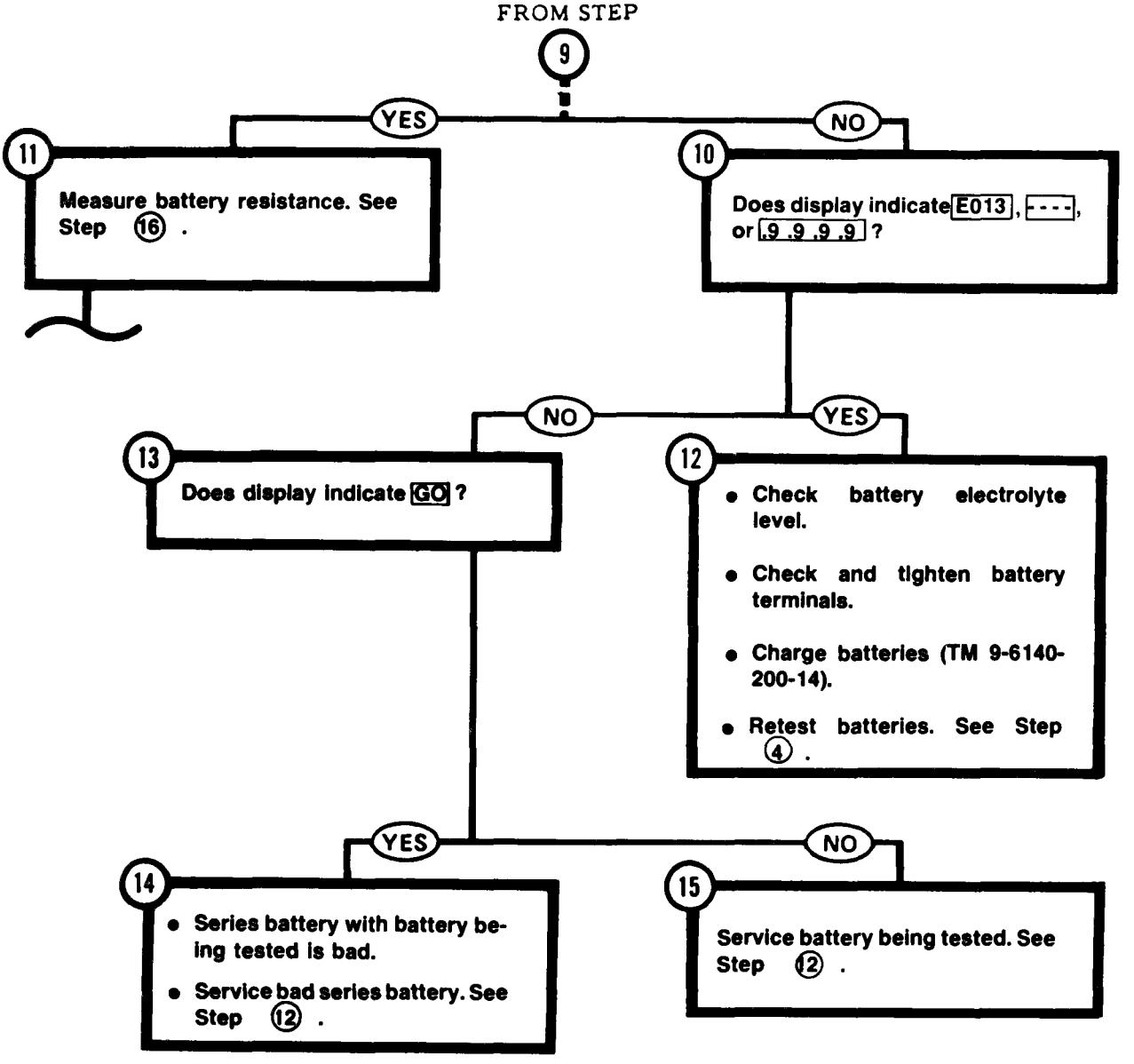
9

- Hold ENGINE FUEL SHUT OFF switch up and crank engine by pressing STARTER switch (not more than 15 seconds) until OFF appears on VTM display.
- Release starter and check that VTM display indicates 25 or less.

Does VTM display indicate 25 or less?

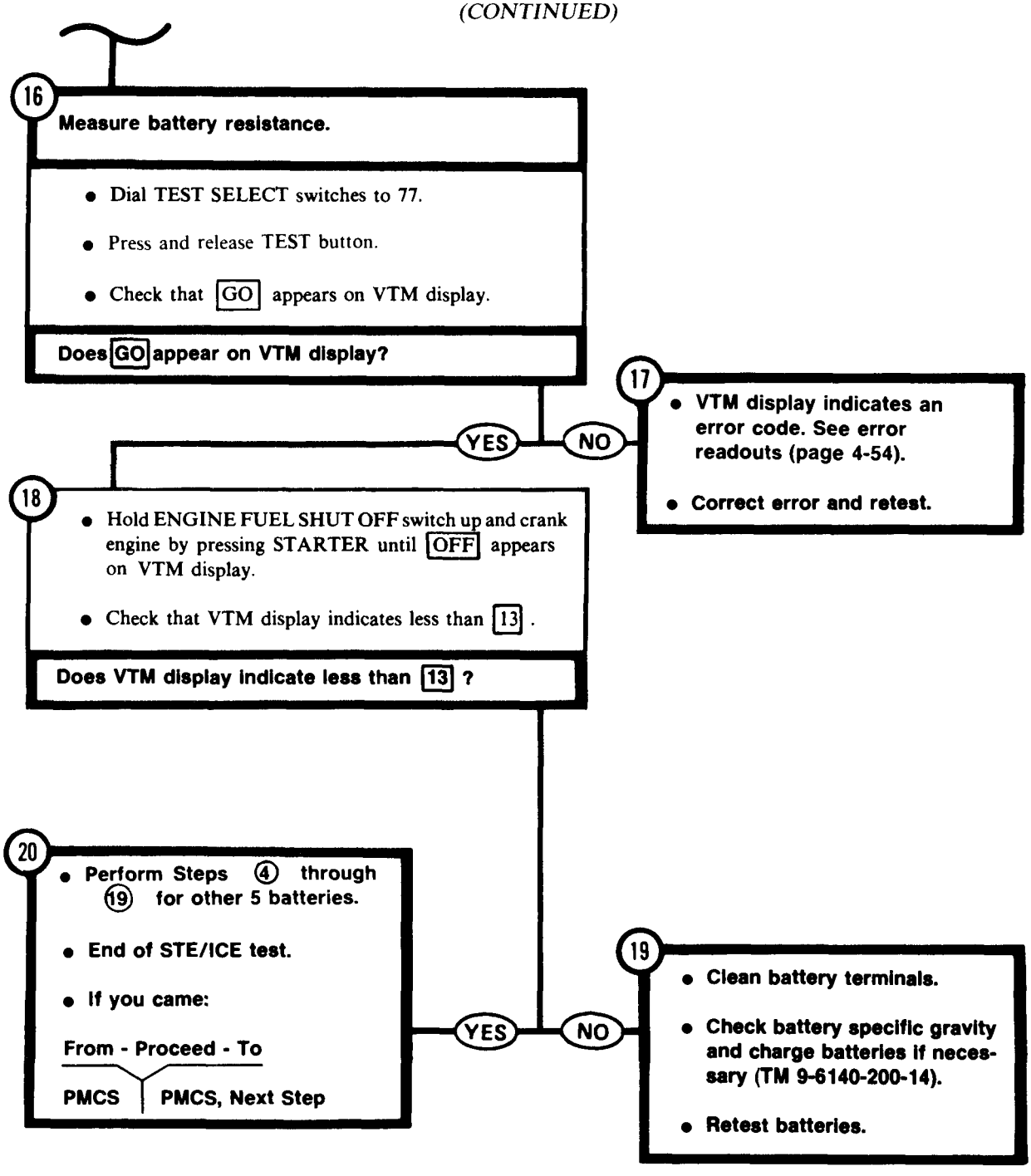
TA249949

STE/ICE TEST PROCEDURES
(CONTINUED)



TA249950

STE/ICE TEST PROCEDURES
(CONTINUED)



TA249951

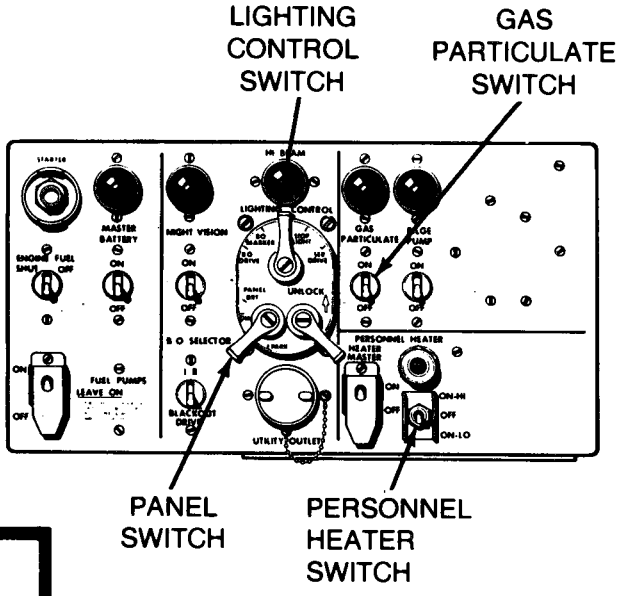
STE/ICE TEST PROCEDURES
(CONTINUED)

CHARGING CIRCUIT AND BATTERY VOLTAGE TEST NO. 67

1. **Perform VTM GENERAL SET UP, CONFIDENCE and IDENTIFICATION TEST NO. 66/60 (page 4-55).**

CAUTION

Engine must be at normal operating temperature before increasing speed to 1500 rpm.



2. **Set engine RPM.**

- Start engine.
- Set engine speed at 1500 rpm.
- Turn LIGHTING CONTROL switch to SERV DRIVE.
- Turn PANEL light switch to PANEL BRT.
- Set PERSONNEL HEATER switch to ON-HI.
- Set GAS PARTICULATE switch to ON.

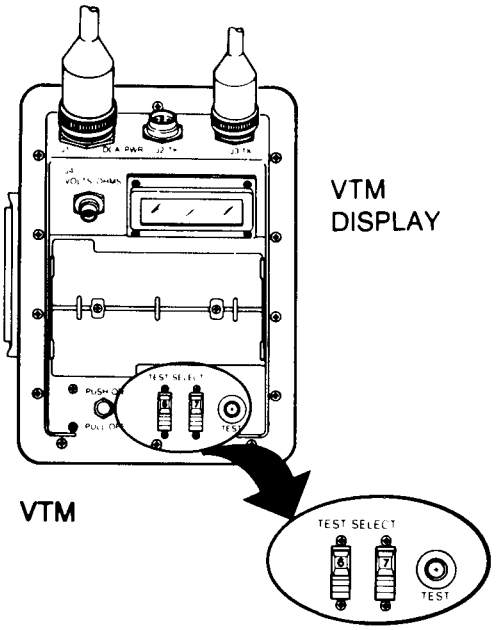
TA249952

STE/ICE TEST PROCEDURES
(CONTINUED)

3 **Measure battery/generator voltage.**

- Dial TEST SELECT switches to 67.
- Press and release TEST button.
- Check that VTM display indicates 27 to 30 volts dc.

Does VTM display 27 to 30 volts dc?



YES — NO

4 **Check for low voltage.**

See Step (8).

5 **Check BATT GEN indicator.**

Check if BATT GEN indicator reads in green area (charging).

Does BATT GEN indicator read in green area?

YES — NO

6

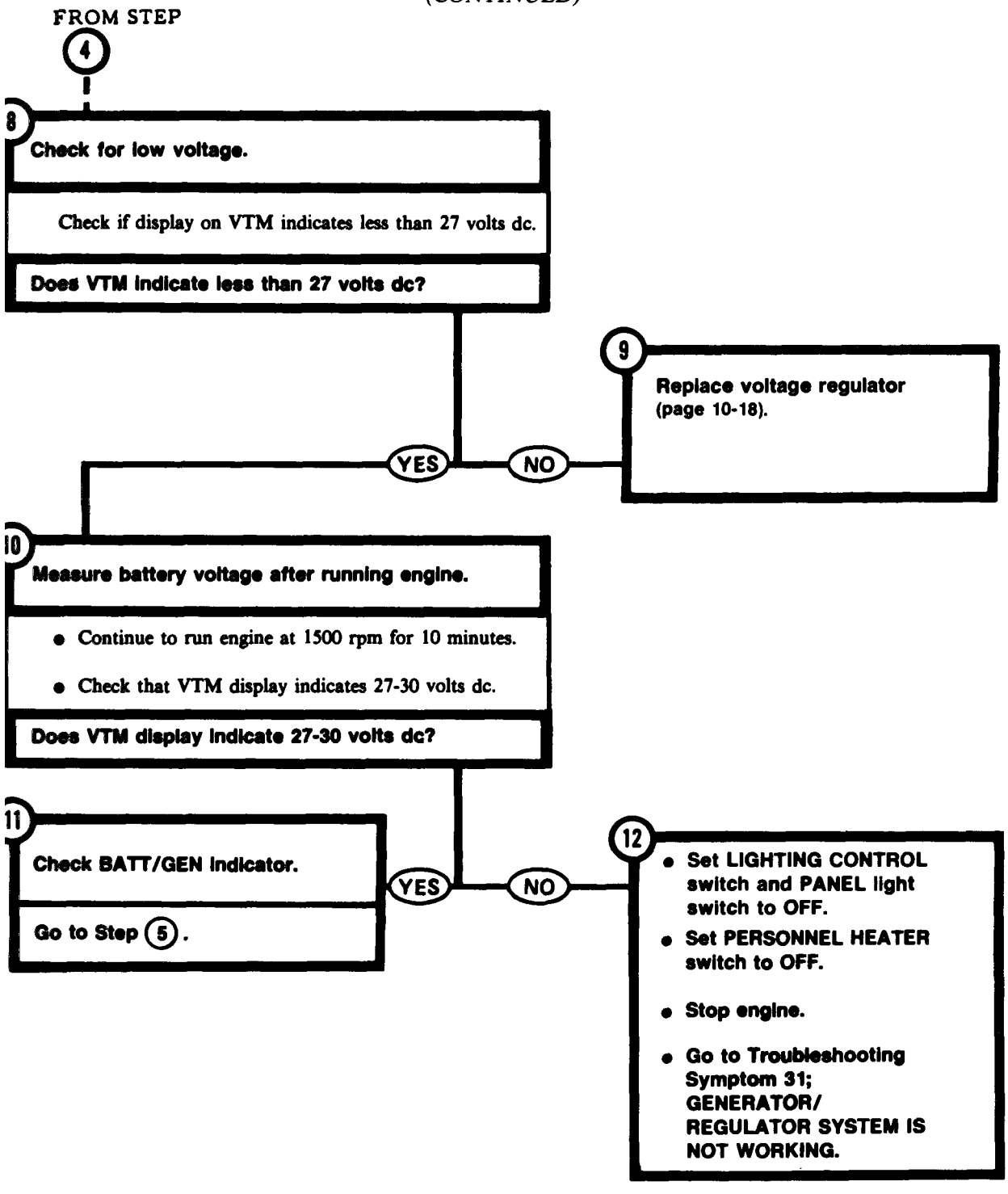
- **Turn LIGHTING CONTROL switch panel light switch to OFF.**
- **Set PERSONNEL HEATER switch to OFF.**
- **Stop engine.**
- **End of STE/ICE test.**
- **If you came:**

From	Proceed To
PMCS	PMCS, Next Step

7 **Go to Troubleshooting Symptom 38; BATTERY/ GENERATOR GAGE POINTER IN YELLOW OR LEFT RED AREA (ENGINE RUNNING)**

TA249953

STE/ICE TEST PROCEDURES
(CONTINUED)



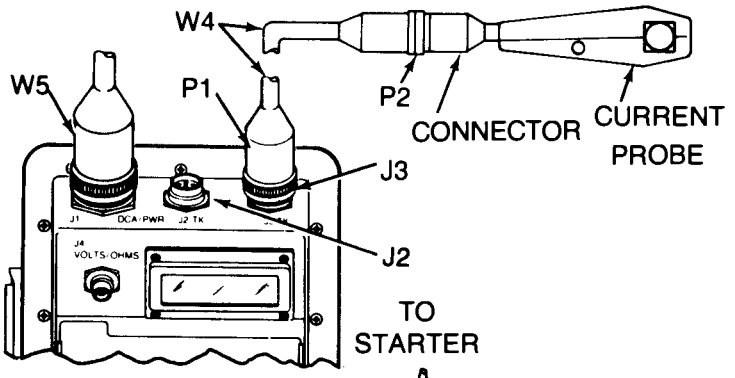
TA249954

STE/ICE TEST PROCEDURES
(CONTINUED)

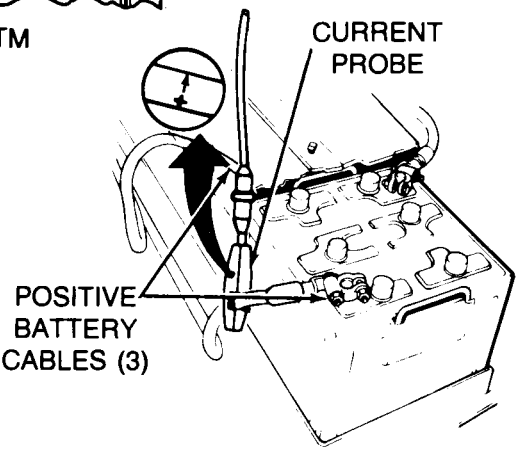
STARTER CURRENT FIRST PEAK TEST NO. 72

WARNING

Make sure engine is not running.

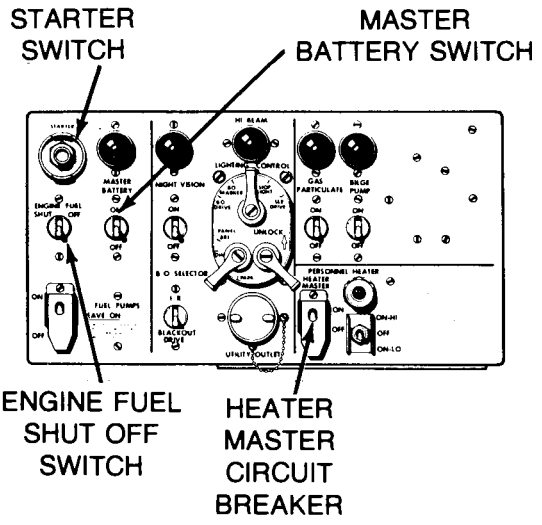


1. **Perform VTM GENERAL SET UP, CONFIDENCE and IDENTIFICATION TEST NO. 66/60 (page 4-55).**



2. **Condition current probe - Do OFFSET.**

- Connect P1 of transducer cable W4 to J2 or J3 on VTM.
- Connect P2 of cable W4 to connector on current probe.
- Clamp current probe around one positive battery cable going to starter with arrow on probe pointing in direction of starter.
- Make sure MASTER BATTERY switch is set to ON.
- Hold ENGINE FUEL SHUT OFF switch up and crank engine for 3 seconds by pressing STARTER switch.
- Set MASTER BATTERY switch to OFF.
- Make sure HEATER MASTER circuit breaker is set to OFF.



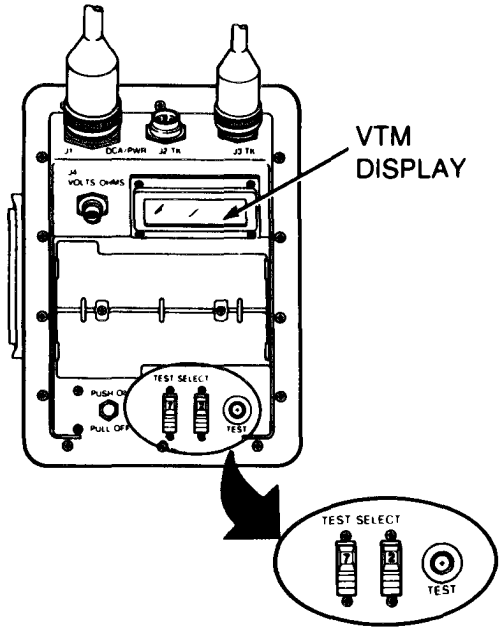
TA249955

FROM STEP 2

STE/ICE TEST PROCEDURES (CONTINUED)

- Dial TEST SELECT switches to 72.
- Press and hold TEST button until CAL message appears on VTM display.
- Release TEST button.
- Check that offset measurement on VTM display indicates between -225 to +225.

Does VTM display indicate between -225 to +225?



YES

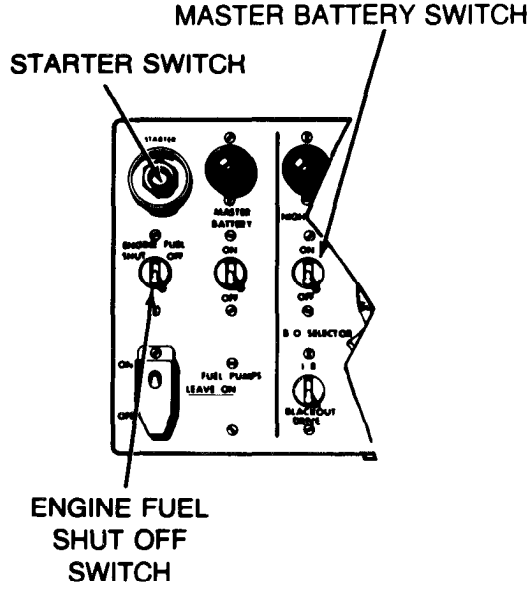
NO

3 Perform OFFSET FAULT ISOLATION (TM 9-4910-571-12 & P).

4 **Check starter current first peak.**

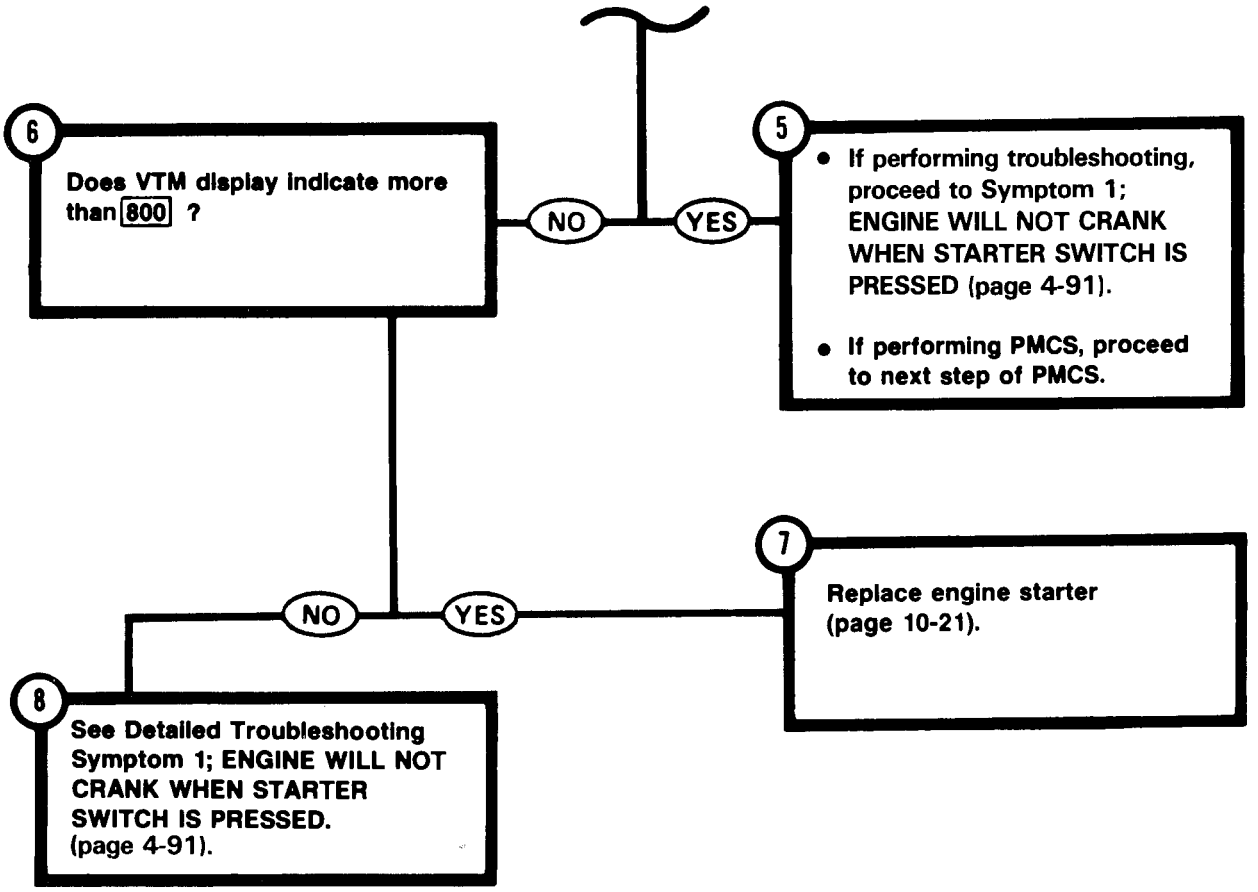
- Set MASTER BATTERY switch to ON.
- Press and release TEST button.
- When GO appears on VTM display, hold ENGINE FUEL SHUT OFF switch up and crank engine by pressing STARTER switch until OFF or E013 appears on VTM display.
- Release STARTER switch.
- Check that VTM displays a number.

Does VTM display between 460 and 800 ?



TA249956

STE/ICE TEST PROCEDURES
(CONTINUED)



TA249957

STE/ICE TEST PROCEDURES
(CONTINUED)

STARTER CIRCUIT RESISTANCE TEST NO. 74

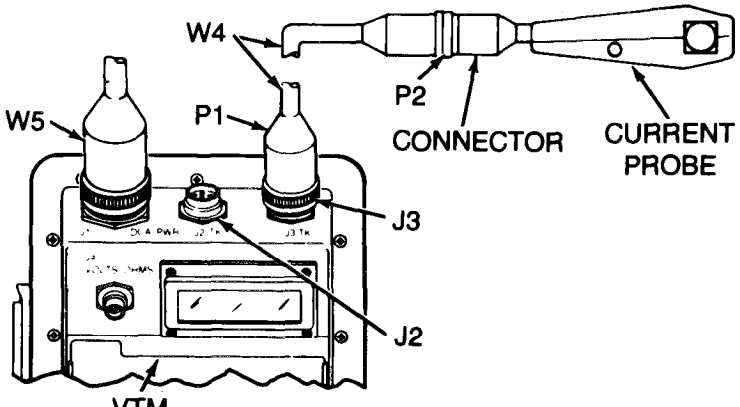
WARNING

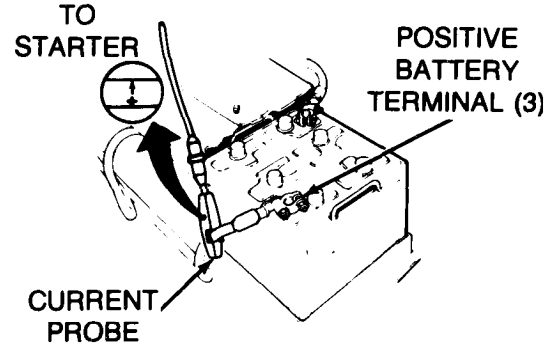
Make sure engine is not running.

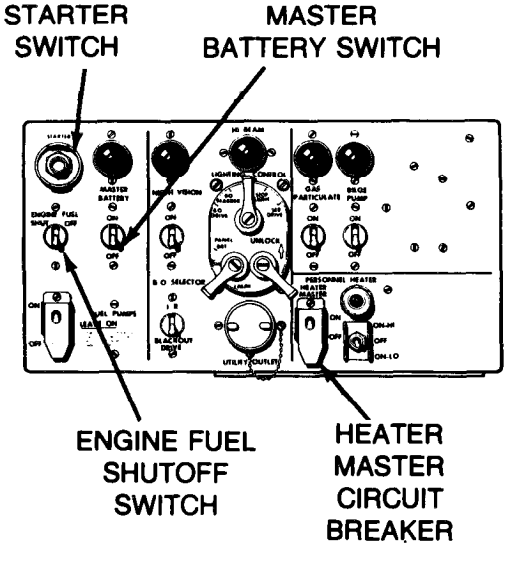
1. **Perform VTM GENERAL SET UP, CONFIDENCE and IDENTIFICATION TEST NO. 66/60 (page 4-55).**

2. **Condition current probe - Do OFFSET.**

- Connect P1 of transducer cable W4 to J2 or J3 on VTM.
- Connect P2 of cable W4 to connector on current probe.
- Clamp current probe around one positive battery cable going to starter with arrow on probe pointing in direction of starter.
- Make sure MASTER BATTERY switch is set to ON.
- Hold ENGINE FUEL SHUT OFF switch up and crank engine for 3 seconds by pressing STARTER switch.
- Set MASTER BATTERY switch to OFF.
- Make sure HEATER MASTER circuit breaker is set to OFF.







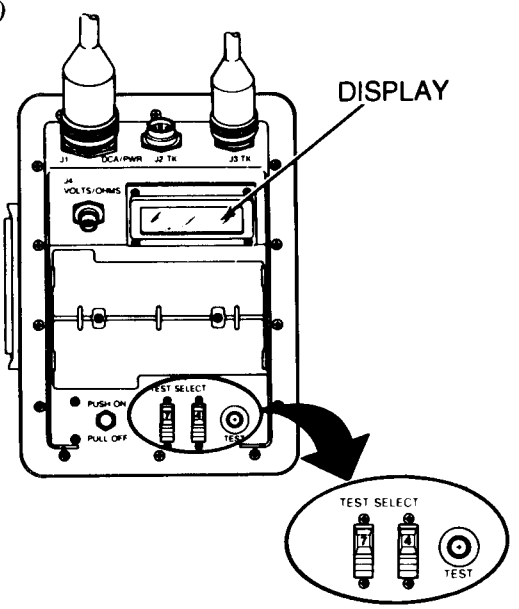
TA249958

STE/ICE TEST PROCEDURES
(CONTINUED)

FROM STEP 2

- Dial TEST SELECT switches to 74.
- Press and hold TEST button until [CAL] message appears on VTM display.
- Release TEST button.
- Check that offset measurement on VTM display indicates between [-225] to [+225].

Does VTM display indicate between [-225] to [+225] ?



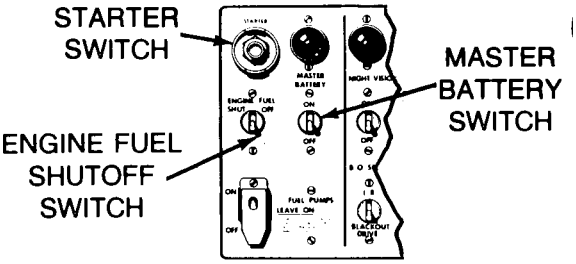
YES — NO

3 **Perform OFFSET FAULT ISOLATION (TM 9-4910-571-12 & P).**

4 **Check starter circuit resistance.**

- Set MASTER BATTERY switch to ON.
- Press and release TEST button.
- Check that VTM display indicates [GO].

Does VTM display indicate [GO] ?



YES — NO

5 **VTM display indicates an error code. See error readouts (page 4-54).**

Correct error and retest.

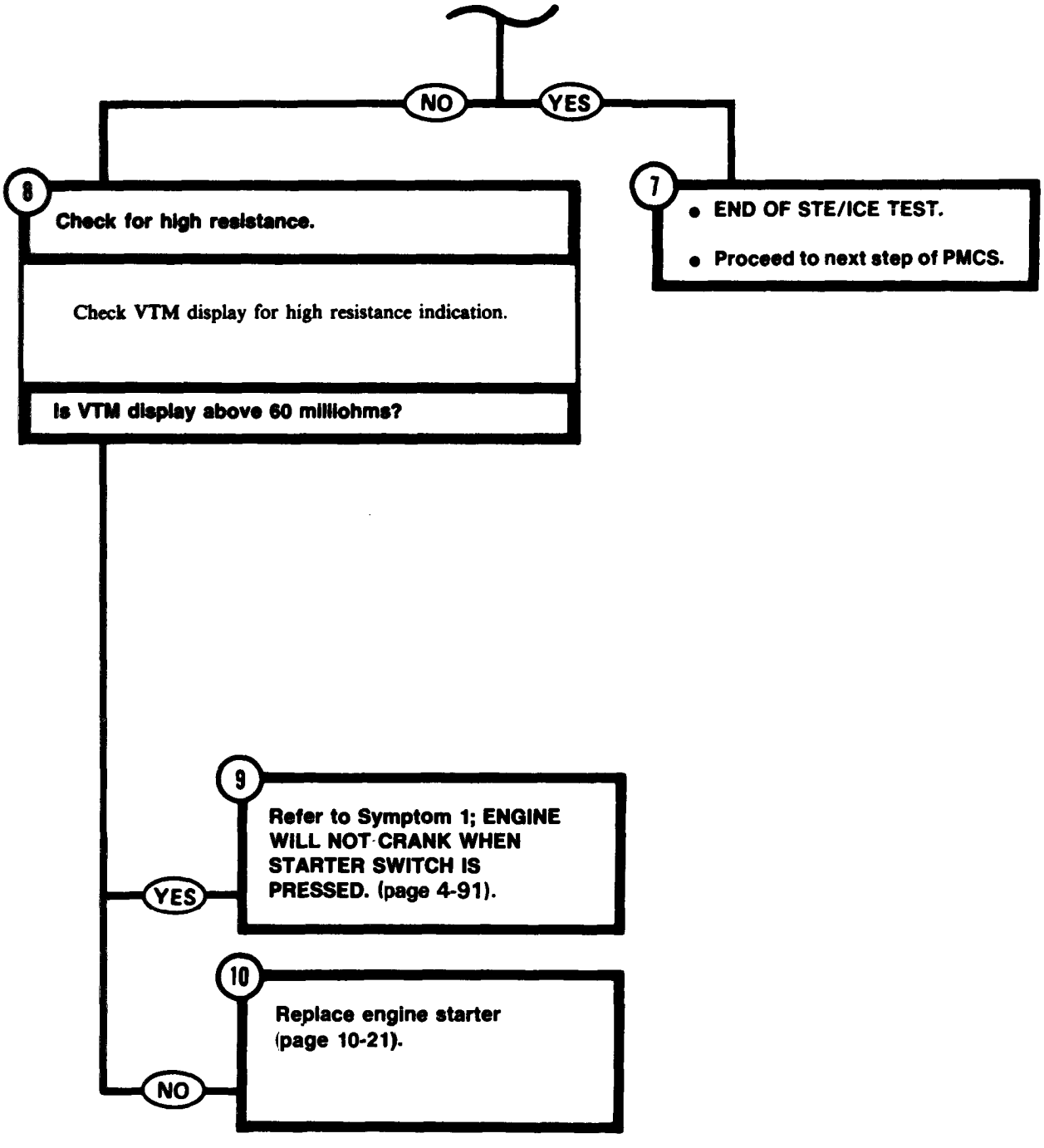
6

- Hold ENGINE FUEL SHUT OFF switch up and crank engine by pressing STARTER switch until [OFF] appears on VTM display.
- Release STARTER switch and set MASTER BATTERY switch to OFF. Check that VTM display indicates between 10 and 60 milliohms.

Does VTM indicate between 10 and 60 milliohms?

TA249959

STE/ICE TEST PROCEDURES
(CONTINUED)



TA249960

STE/ICE TEST PROCEDURES
(CONTINUED)

CI POWER TEST NO. 13

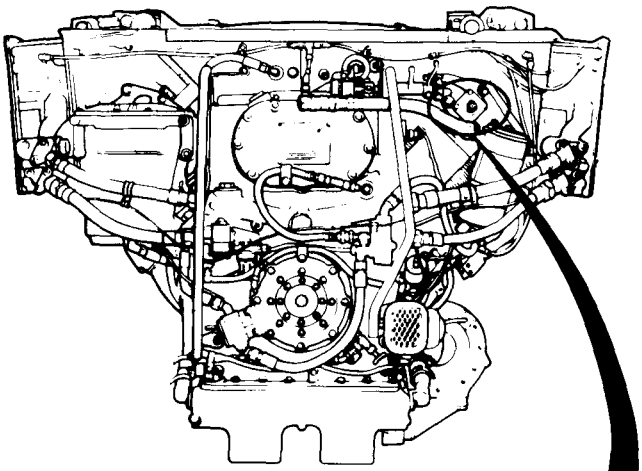
WARNING

Stop engine before installing pulse tachometer transducer.

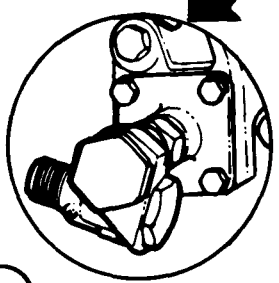
CAUTION

Clean all mounting surfaces before installing pulse tachometer transducer and tachometer drive adapter to prevent entry of foreign matter that may damage engine or test equipment.

1. **Perform VTM GENERAL SET UP, CONFIDENCE and IDENTIFICATION TEST NO. 66/60 (page 4-55).**



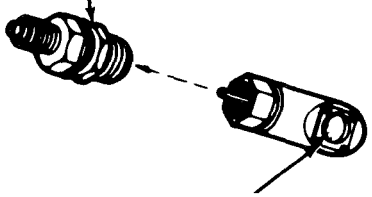
POWERPLANT REMOVED FOR CLARITY



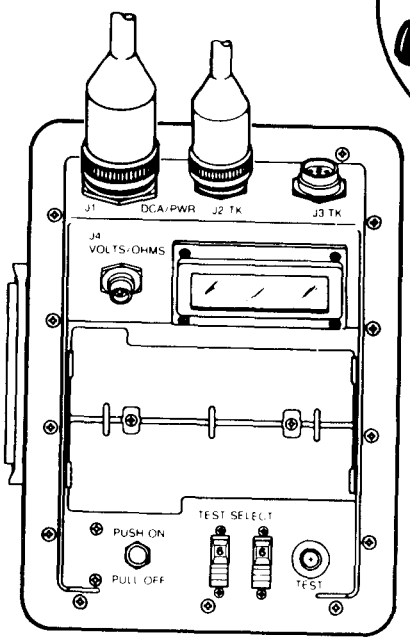
ENGINE TACHOMETER ADAPTER

DRIVE ADAPTER

(USED ONLY AT OPERATOR'S STATION)



PULSE TACHOMETER TRANSDUCER



VTM

TA249961

STE/ICE TEST PROCEDURES
(CONTINUED)

2 Where is test being performed?

At Operator's Station.

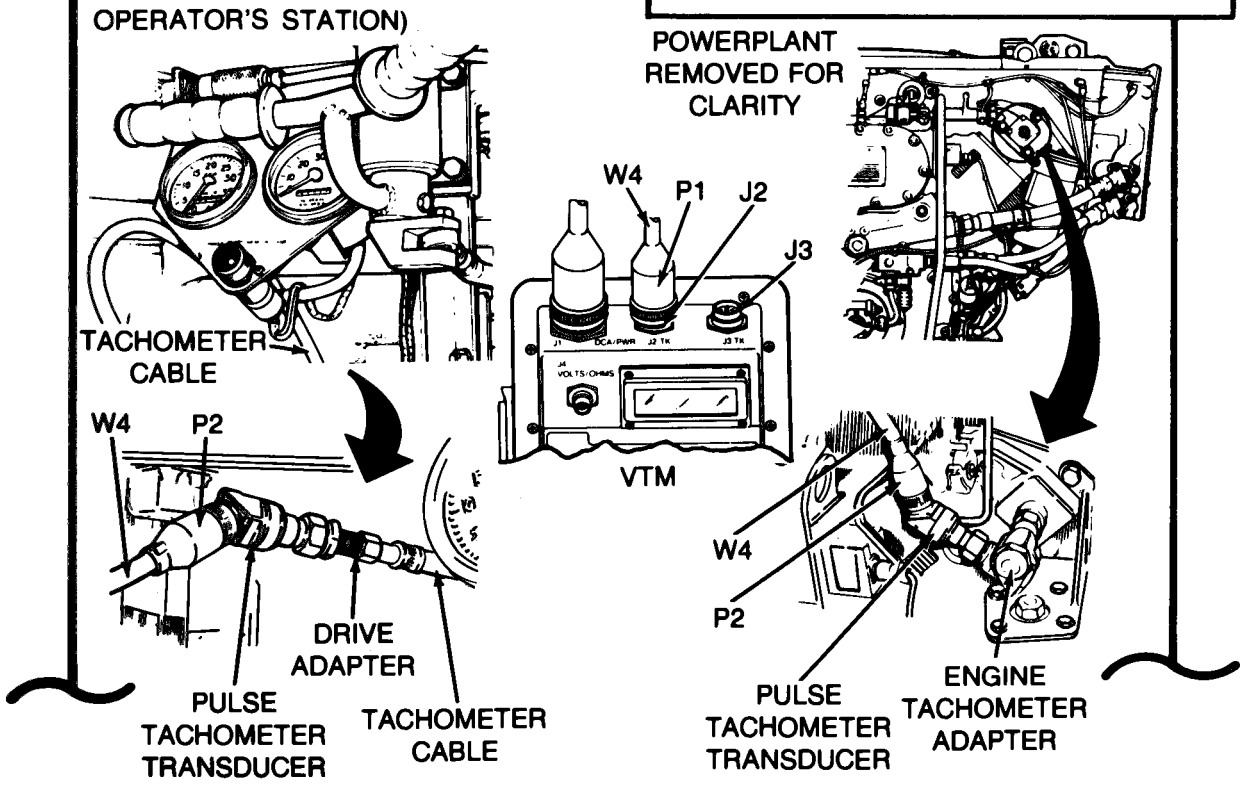
3 Install tachometer adapter, pulse tachometer, transducer - connect cables.

- Disconnect tachometer cable from tachometer.
- Install drive adapter onto tachometer cable.
- Install pulse tachometer transducer onto drive adapter.
- Connect P1 of transducer cable W4 to J2 or J3 on VTM.
- Connect P2 of transducer cable W4 to connector on pulse tachometer.

At powerplant.

3 Install pulse tachometer - connect cables.

- Open left top deck grille doors.
- Disconnect tachometer cable from engine tachometer adapter.
- Install pulse tachometer transducer on engine tachometer adapter.
- Connect P1 of transducer cable W4 to J2 or J3 on VTM.
- Connect P2 of transducer cable W4 to connector on pulse tachometer transducer.



TA249962

STE/ICE TEST PROCEDURES
(CONTINUED)

4 • **Apply parking brake.**
• **Start engine.**

4 • **Apply parking brake.**
• **Start engine.**

CAUTION

Do not perform power test unless engine is operating at normal operating temperature.

5 **Perform engine-governed no-load rpm test.**

- Dial TEST SELECT switches to 10.
- Press and release TEST button.

CAUTION

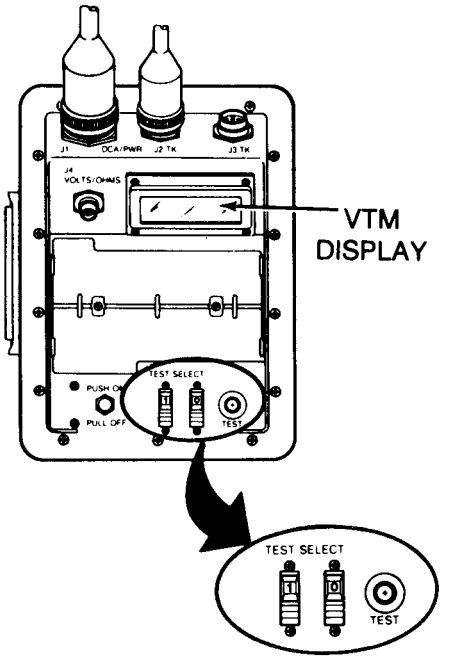
Do not run engine faster than 2640 rpm for more than 2 or 3 seconds in the event of governor malfunction.

NOTE

In most cases, engine speed will surge over 2600 rpm and then stabilize within 30 seconds between 2550 and 2640 rpm.

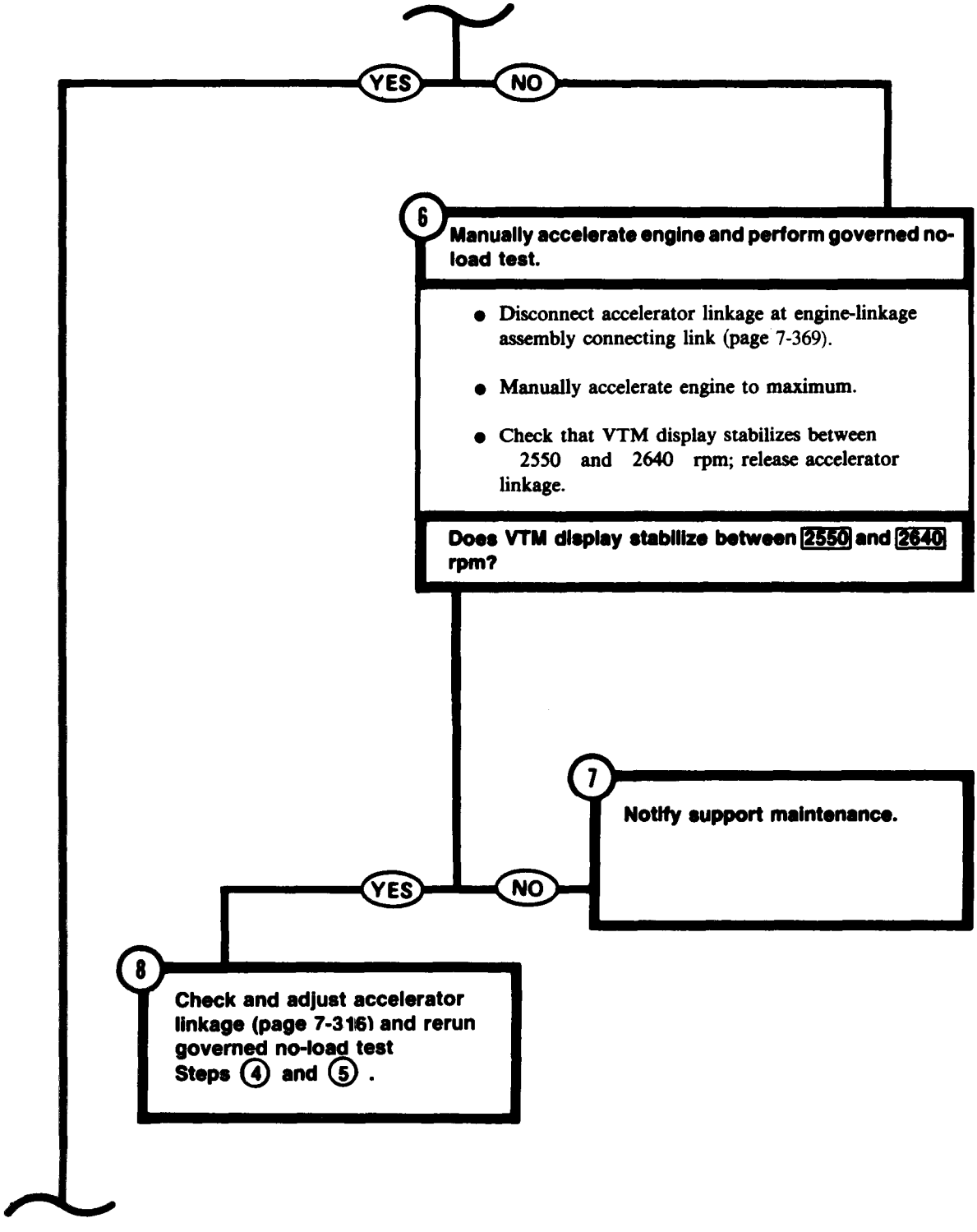
- Gradually depress accelerator pedal to floor.
- Check that VTM display stabilizes between 2550 and 2640 rpm. Release accelerator.

Does VTM display stabilize between 2550 and 2640 rpm?



TA249963

STE/ICE TEST PROCEDURES
(CONTINUED)



TA249964

STE/ICE TEST PROCEDURES
(CONTINUED)

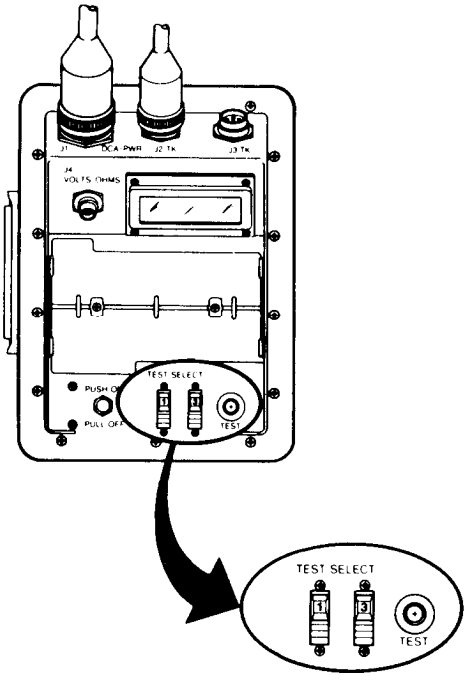
NOTE

Read and understand the following steps before proceeding.

9 **Perform CI power test.**

- Dial TEST SELECT switches to 13.
- Press and release TEST button.
- When VTM display indicates CTP, quickly depress accelerator pedal to floor and hold until VTM display indicates OFF
- When VTM display indicates OFF, immediately release accelerator.
- Check that VTM display indicates 75 or more.

Does VTM display indicate 75 or more?



YES

11

- **End of STE/ICE Test.**
- **If you came:**

From - Proceed - To	
PMCS	PMCS, Next Step

NO

10 **See Symptom 11; ENGINE WILL NOT RUN RIGHT.**

TA249965

STE/ICE TEST PROCEDURES
(CONTINUED)

TEST 89

DC VOLTAGE TEST NO. 89

1 **Perform VTM GENERAL SET UP, CONFIDENCE and IDENTIFICATION TEST NO. 66/60 (page 4-55).**

2 **Connect test probe cable to VTM, do OFFSET test.**

- Connect P1 of test probe cable W2 to J4 of VTM.
- Connect red and black clip leads/probes of cable W2 together.
- Dial TEST SELECT switches to 89.
- Press TEST button and hold until VTM display indicates [CAL].
- Release TEST button.
- Check that offset measurement on VTM display indicates between [-6.8] to [+6.8].

Does VTM display indicate between [-6.8] to [+6.8] ?

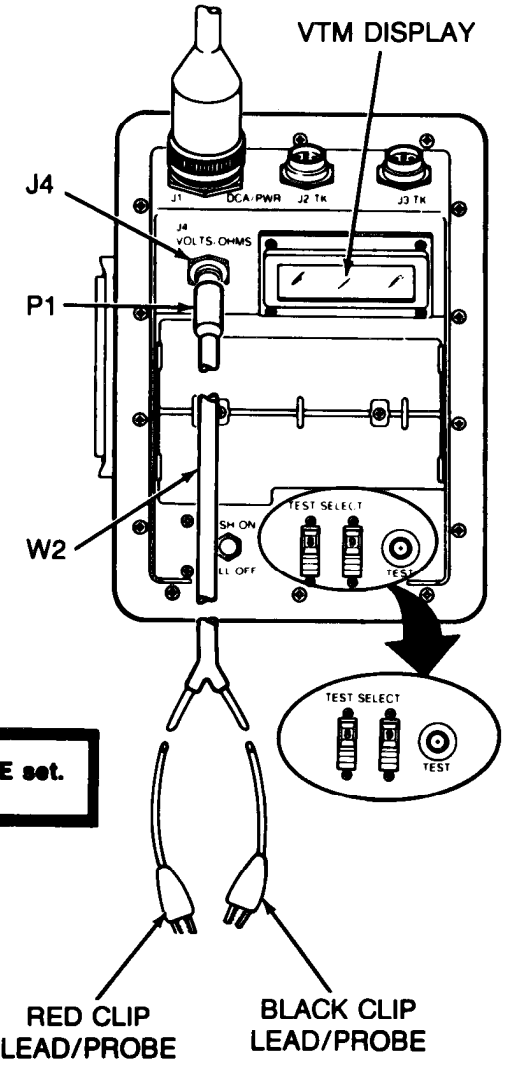
YES — NO

3 **Replace STE/ICE set.**

4 **Determine use of STE/ICE set.**

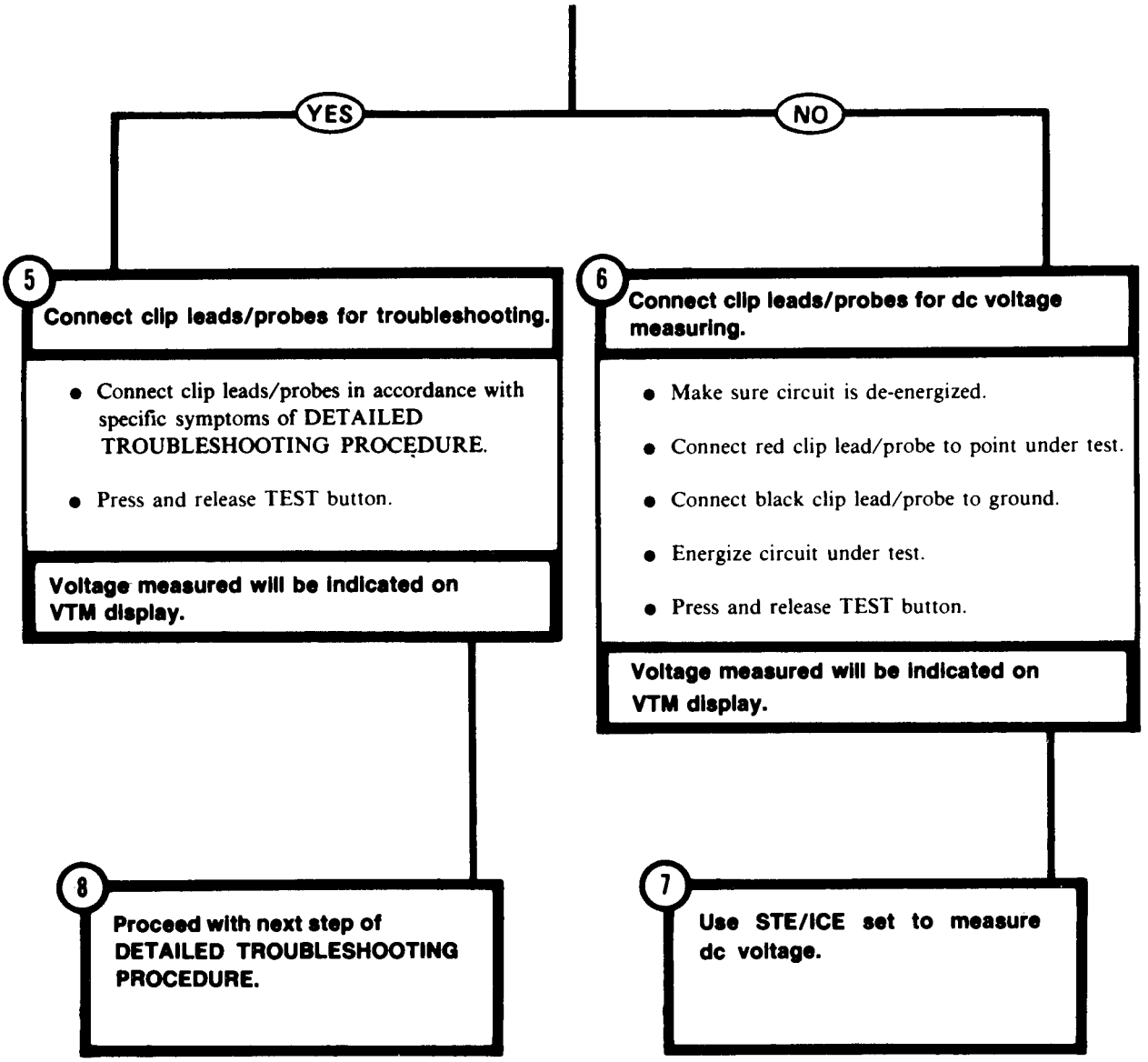
Check if STE/ICE set is to be used with DETAILED TROUBLESHOOTING PROCEDURES.

Is STE/ICE set to be used with DETAILED TROUBLESHOOTING PROCEDURES?



TA249966

STE/ICE TEST PROCEDURES
(CONTINUED)



TA249967

STE/ICE TEST PROCEDURES
(CONTINUED)

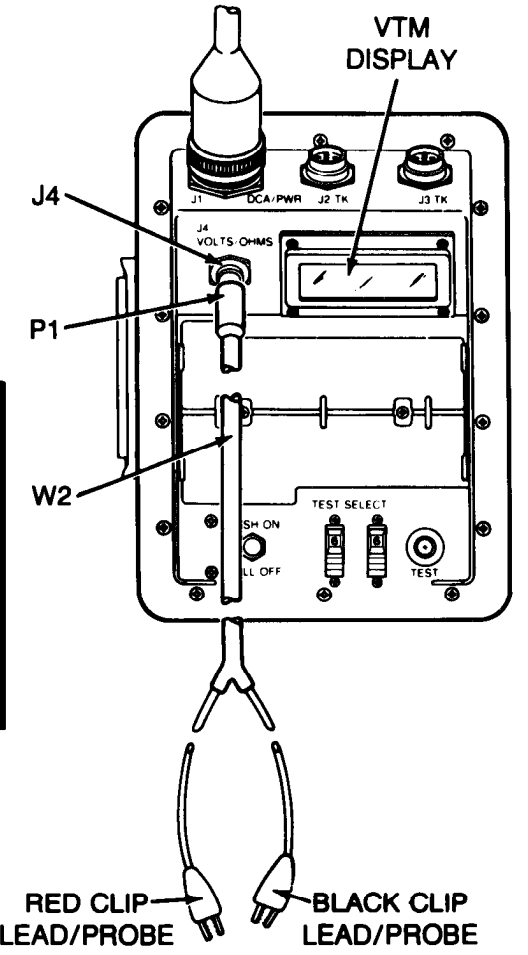
RESISTANCE AND CONTINUITY CHECK TEST NO. 91/92

1 **Perform VTM GENERAL SET UP, CONFIDENCE and IDENTIFICATION TEST NO. 66/60 (page 4-55).**

2 **Connect test probe cable to VTM.**

- Connect P1 of test probe cable W2 to J4 of VTM.
- Connect red and black clip leads/probes of cable W2 together.

Is STE/ICE to be used to check continuity/0-1500 ohms resistance?



YES

3 **Continuity/0-1500 ohms resistance check.**

Proceed with Step 5.

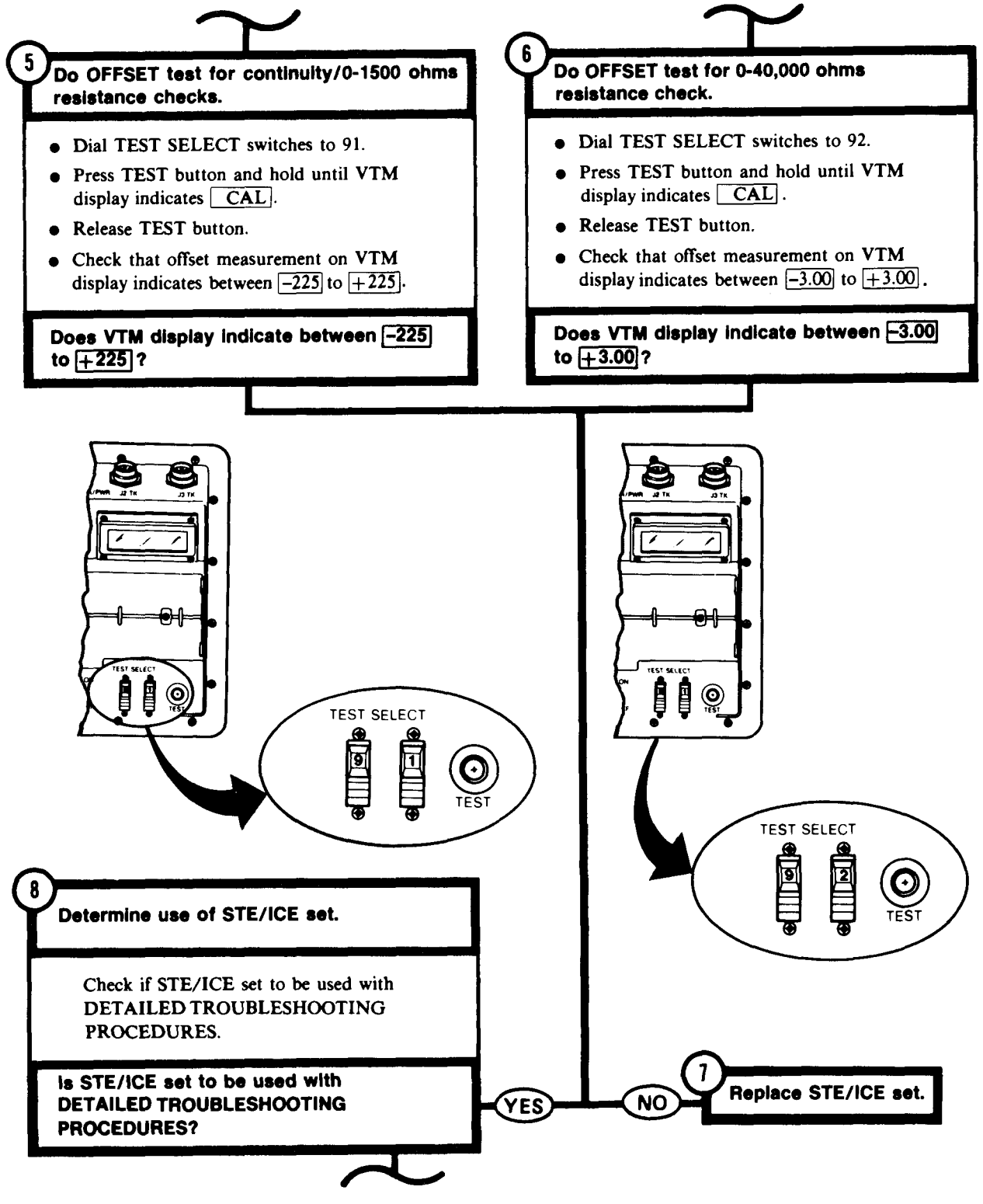
NO

4 **0-40,000 ohms resistance check.**

Proceed with Step 6.

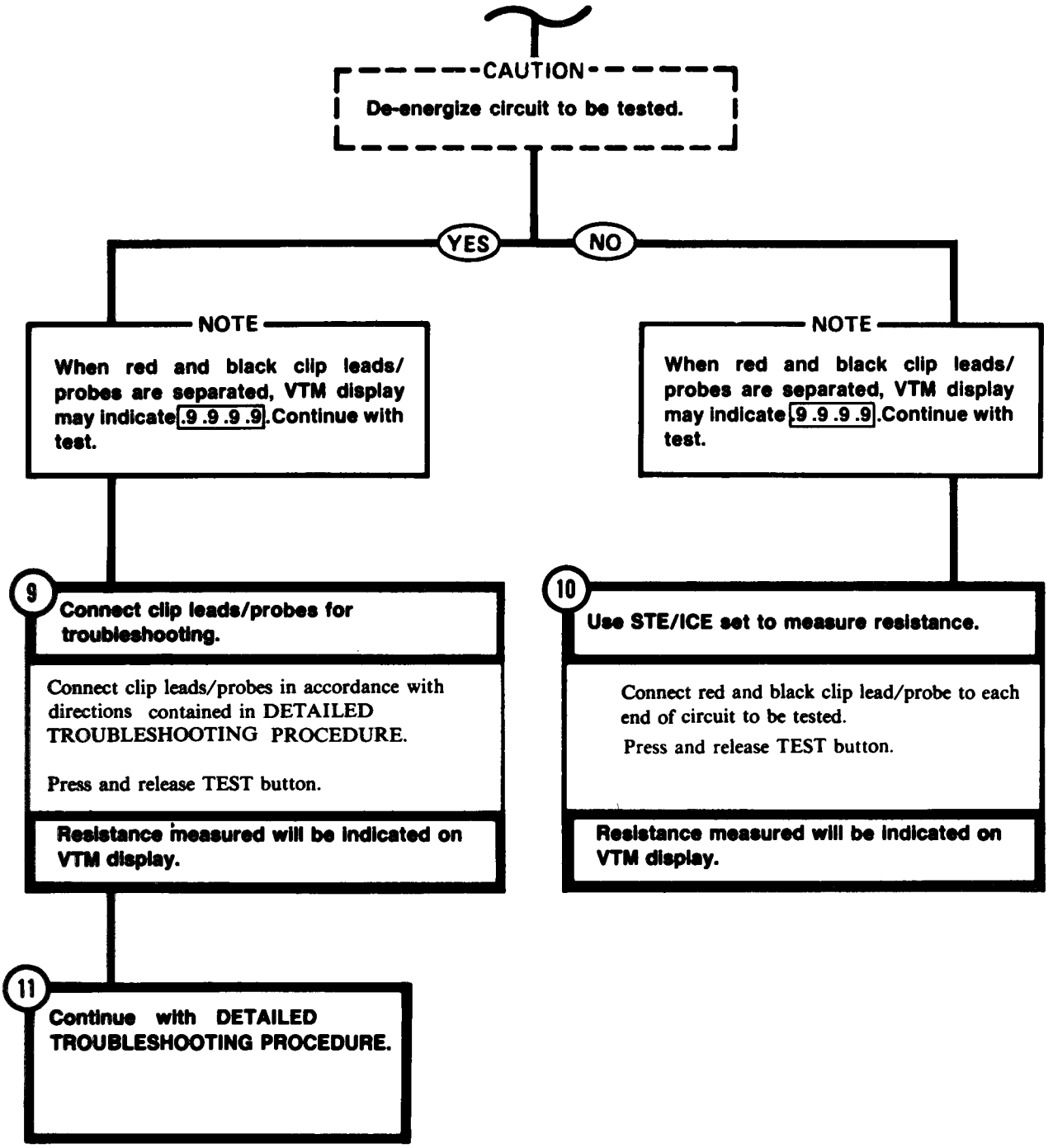
TA249968

STE/ICE TEST PROCEDURES
(CONTINUED)



TA249969

STE/ICE TEST PROCEDURES
(CONTINUED)



TA249970

STE/ICE TEST PROCEDURES
(CONTINUED)

COMPRESSION UNBALANCE TEST NO. 14

CAUTION
Do not perform more than 2 compression unbalance tests in a row or tank batteries may become discharged. Engine must be at normal operating temperature before performing compression unbalance test.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1. **Perform VTM GENERAL SET UP, CONFIDENCE and IDENTIFICATION TEST NO. 66/60 (page 4-55).**

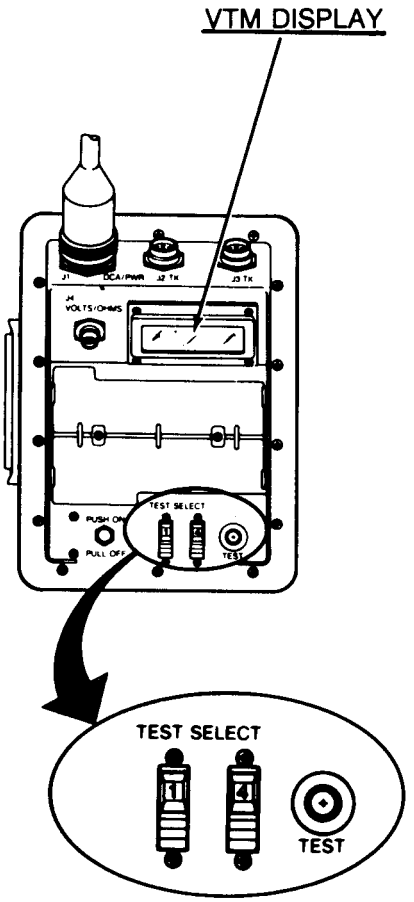
2. **Condition tank-shut-off engine.**

   Second Technician (Driver's Compartment)
   - Make sure engine is running at normal operating temperature.
   - Run engine at fast idle (1500 rpm) for 2 minutes.
   - Stop engine.

3. **Condition STE/ICE set.**

   Second Technician
   - Make sure MASTER BATTERY switch is ON.

   First Technician (Turret)
   - Dial TEST SELECT switches to 14.
   - Press then release TEST button.
   - Wait for message GO to appear on the VTM display.



TA249971

STE/ICE TEST PROCEDURES
(CONTINUED)

NOTE
Read and understand the following steps before proceeding.

4 **Perform compression unbalance test.**

- VTM display will indicate GO

Second Technician

- Hold ENGINE FUEL SHUT OFF switch up and crank engine by pressing STARTER switch and holding until VTM display indicates ----.
- Release STARTER switch when VTM display changes from ---- to OFF or EO13.
- Check that VTM display changes to indicate a number between 0 - 15.

Does VTM display indicate a number between 0 - 15 ?

YES / NO

5 **Does VTM display GO ?**

NO / YES

6
- **End of STE/ICE test.**
- **If you came:**

From -	Proceed To
Symptom 1	Symptom 1 Step ①
Symptom 17	Symptom 17 Step ⑤

7 **Does VTM display FAIL ?**

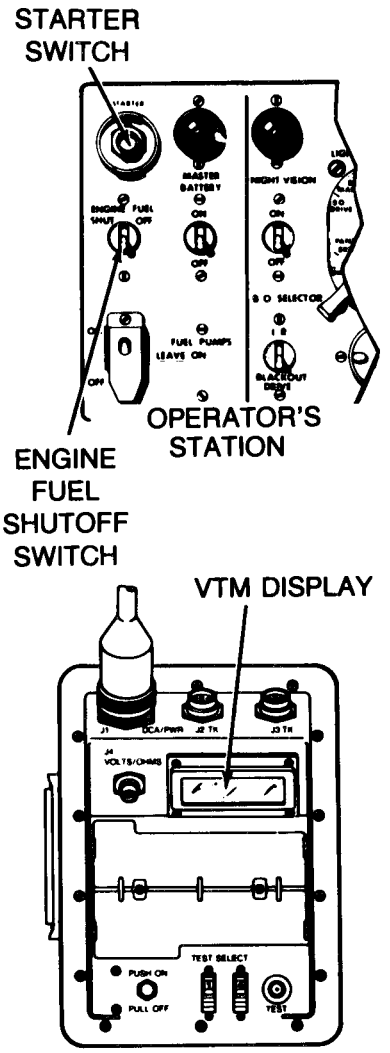
YES / NO

9 **Rerun compression unbalance test.**

IF VTM display still indicates FAIL, notify support maintenance.

8
- Operator may have stopped cranking during test.
- Batteries may be discharged. Check battery electrolyte level, specific gravity and recharge batteries (TM 9-6140-200-14).

Correct problem, repeat test.



TA249972

STE/ICE TEST PROCEDURES
(CONTINUED)

PRESSURE 0-1000 PSIG TEST NO. 50

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1. **Perform VTM GENERAL SET UP, CONFIDENCE and IDENTIFICATION TEST NO. 66/60 (page 4-55).**

NOTE

When performing the offset test, make sure engine is off and system to be tested is depressurized.

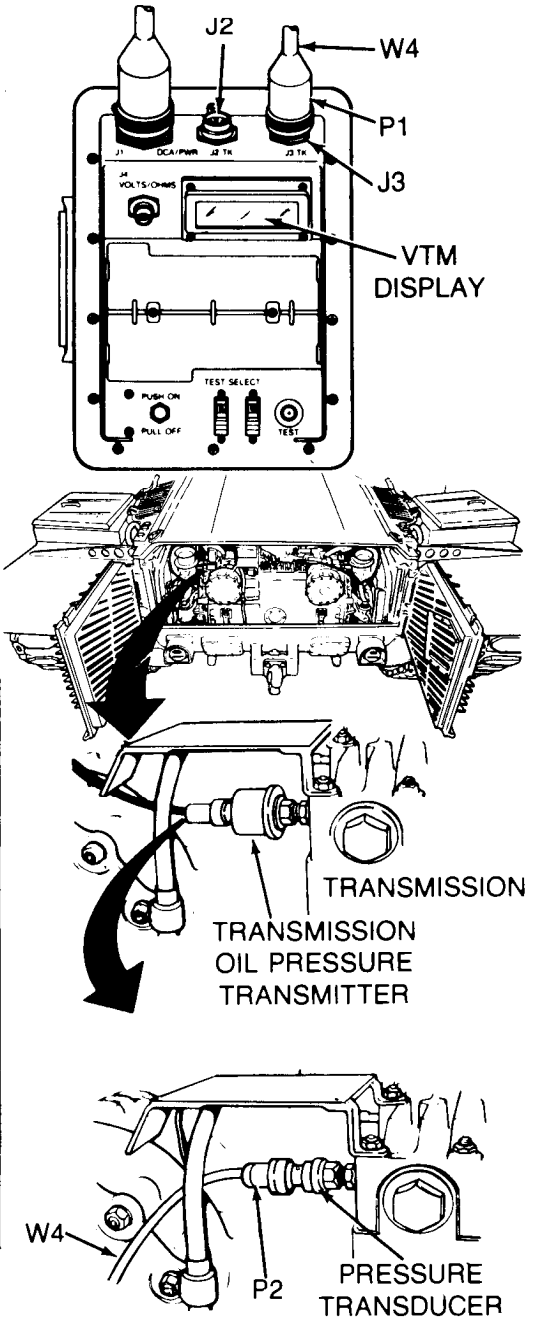
2. **Connect test cables and pressure transducer.**

First Technician (Rear Grille Doors)

- Connect P1 of transducer cable W4 to J2 or J3 on VTM.
- Connect P2 of cable W4 to cable adapter J1 (MS3119E14-19).
- Connect P1 of second W4 cable to J1 adapter.

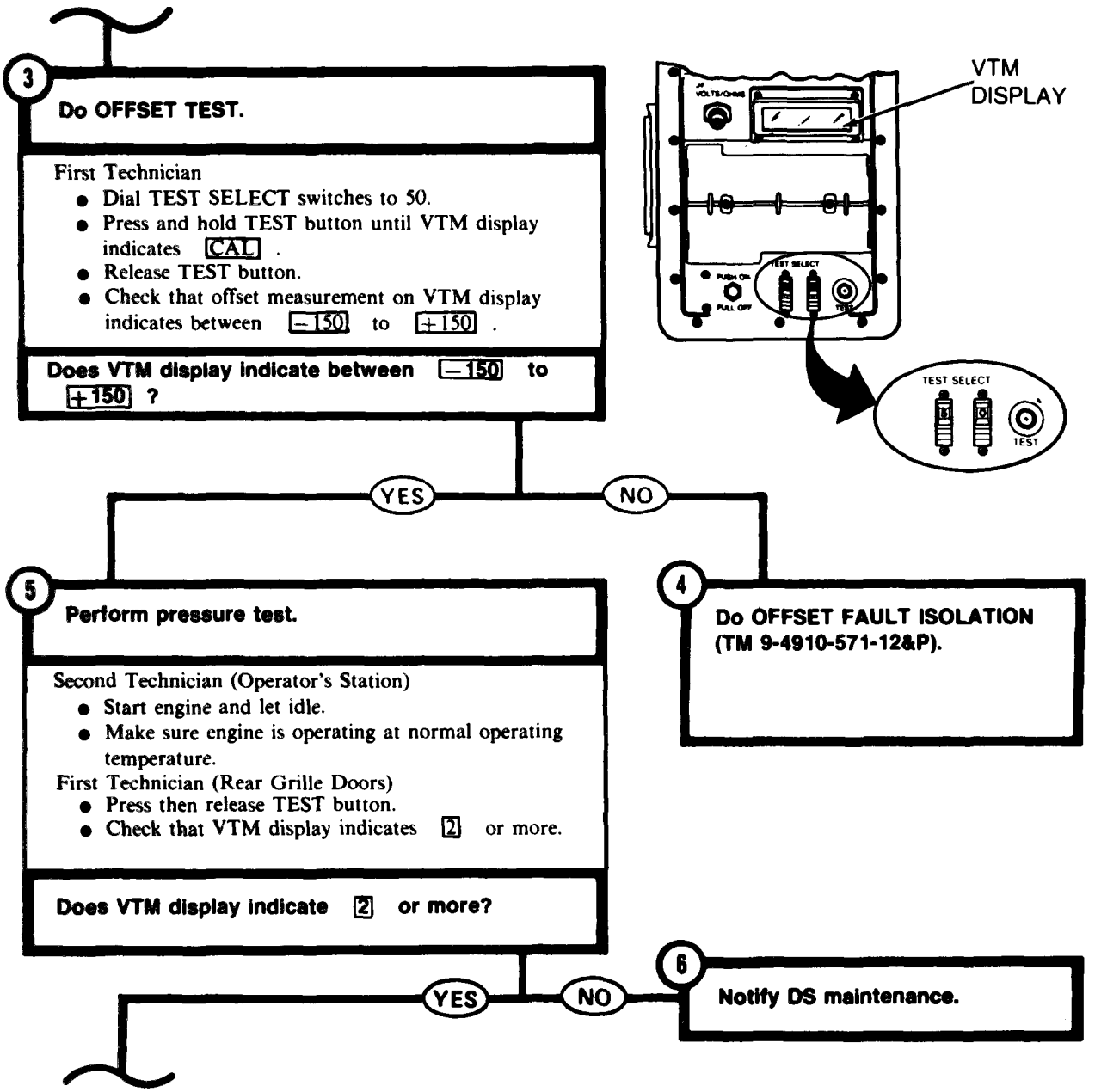
Both Technicians (Rear Grille Doors)

- Open rear grille doors.
- Remove transmission shroud (page 9-2).
- Remove transmission oil pressure transmitter (page 10-231).
- Install blue stripe 0-1000 psig pressure transducer (12258876) on transmission.
- Connect P2 of second cable W4 to connector on pressure transducer.



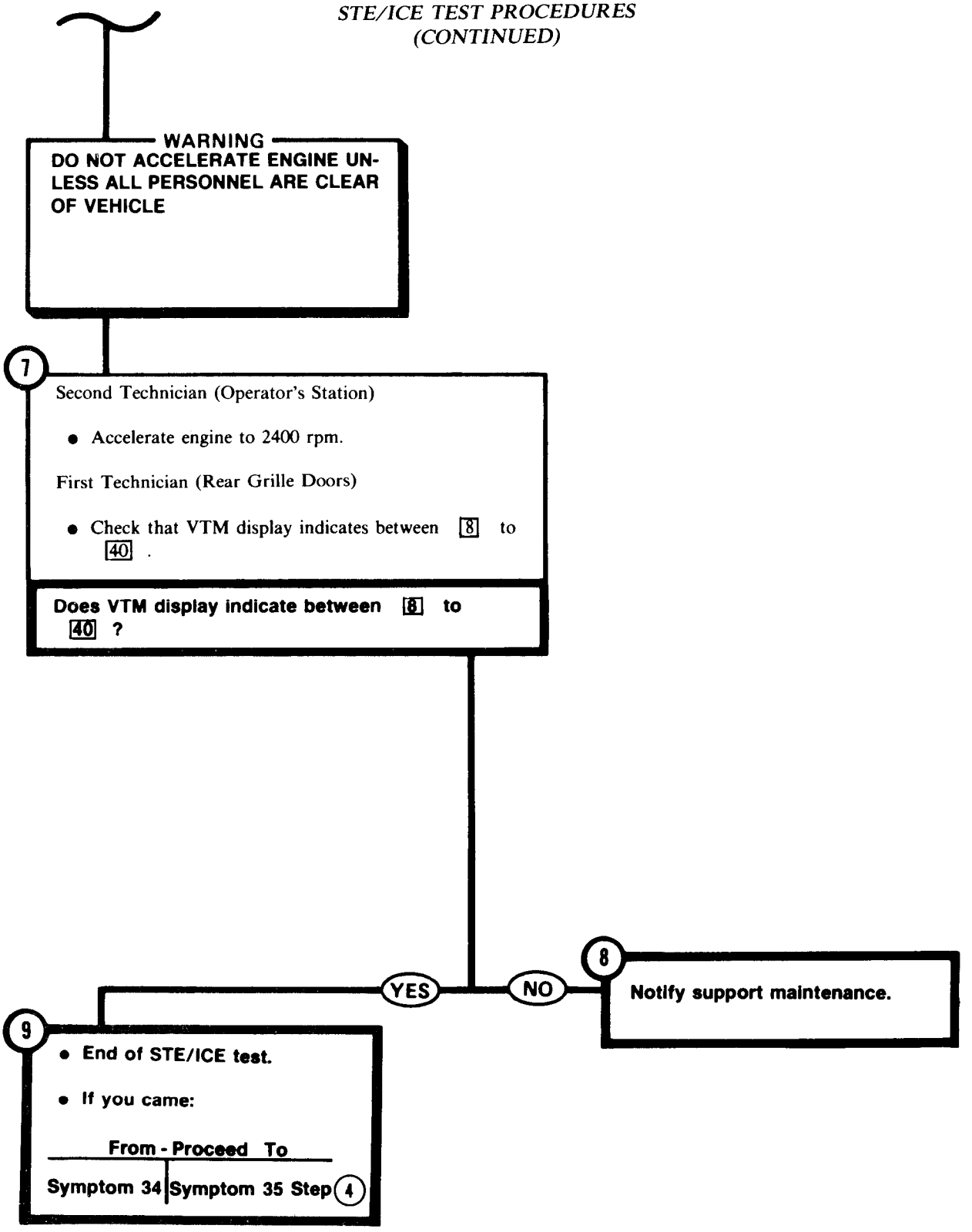
TA249973

STE/ICE TEST PROCEDURES
(CONTINUED)



TA249974

STE/ICE TEST PROCEDURES
(CONTINUED)



TA24997

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING

Symptom-1

ENGINE WILL NOT CRANK WHEN STARTER SWITCH IS PRESSED.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

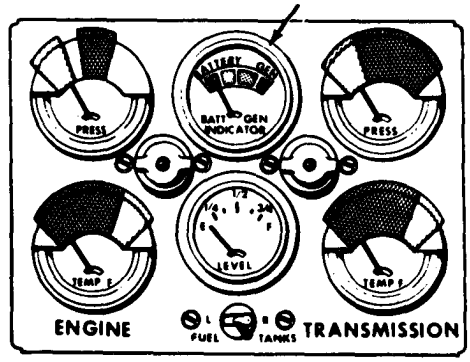
(1) Check for electrical power in the vehicle by observing BATT GEN INDICATOR for movement.

First Technician (Operator's Station)

- Observe position of BATT GEN INDICATOR when MASTER BATTERY switch is OFF.
- Set MASTER BATTERY switch ON.
- Check position of BATT GEN INDICATOR.

Did the BATT GEN INDICATOR move when MASTER BATTERY switch was turned ON?

BATT-GEN INDICATOR



GAGE INSTRUMENT PANEL

YES

NO

(2) Check if MASTER BATTERY indicator lamp lights.

See Step (54).

TA249976

Symptom-1

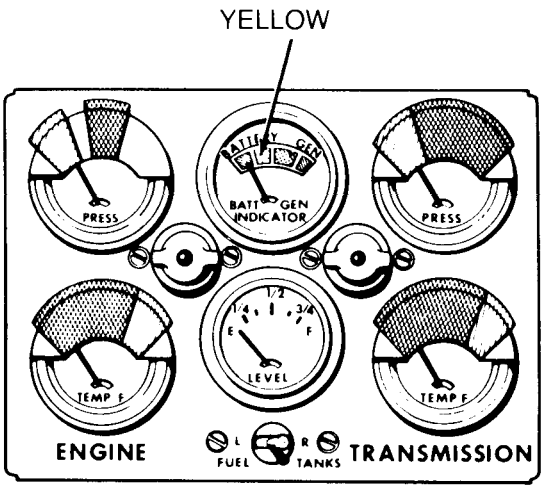
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

3 **Check BATT GEN INDICATOR gage for above mid yellow indication.**

First Technician (Operator's Station)

Visually check if BATT GEN INDICATOR gage indicates above mid yellow.

Does BATT GEN INDICATOR gage indicate above mid yellow?



YES

NO

4

- **Service batteries TM 5-5420-226-10.**
- **Charge batteries (TM 9-6140-200-14).**
- **If STE/ICE is available, perform Test No. 77/79 BATTERY CONDITION TEST (page 4-60).**

TA249977

Symptom-1

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

NOTE

- **If STE/ICE is available, perform Test No. 72 STARTER CURRENT FIRST PEAK (page 4-70).**
- **If STE/ICE is not available, go to Step (5).**

5 **Check for sound of starter solenoid and/or starter engaging.**

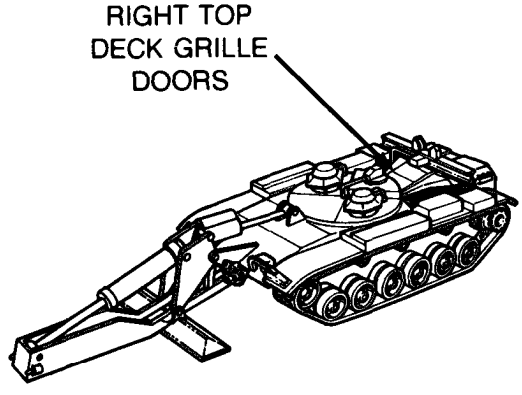
Second Technician (Top Deck)

- Open right top deck grille doors.
- Listen for clicks or other noise coming from starter when starter switch is pressed.

First Technician (Operator's Station)

- Set FUEL PUMPS switch OFF.
- Press STARTER switch several times.

Is there a clicking sound, or other noise from starter when STARTER switch is pressed?



NO

YES

6

- **Check for locked engine.**
- **See Step (32).**

TA249978

Symptom-1

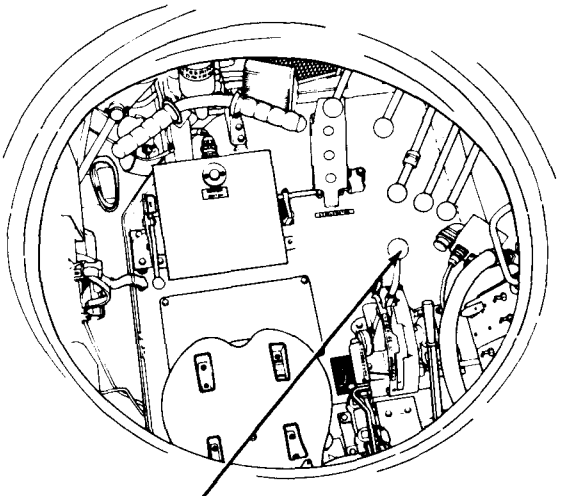
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

7 **Check for transmission shift lever to be in P (park) position.**

First Technician (Operator's Station)

- Move transmission shift lever out of "P" into "H", "L", or "R" positions and return lever to "P" position.
- Attempt to start engine.

Does engine crank?



TRANSMISSION SHIFT LEVER

NO

YES

8 **Adjust shift control linkage (page 11-52).**

TA249979

Symptom-1

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

9 **Check for electrical power at neutral shift switch.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

Second Technician (Rear Grille Doors)

- Disconnect both transmission harness connectors (CKT 14) from neutral shift switch.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to one of the two CKT 14 transmission harness connectors at neutral shift switch and black probe to ground.

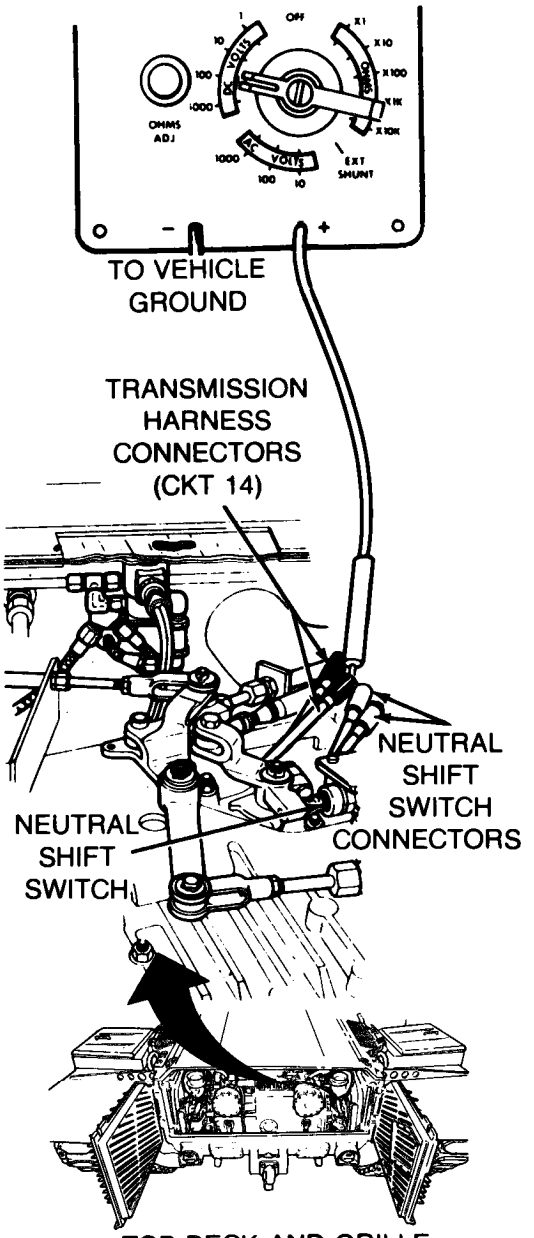
First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and hold starter switch for about 5 seconds.

Second Technician (Rear Grille Doors)

- Check if meter indicates 18 to 30 volts dc.
- Repeat above check moving red probe of meter to other CKT 14 transmission harness connector at neutral shift switch.

Did meter indicate 18 to 30 volts dc at one of the two (CKT 14) transmission harness connectors?



YES

NO

10

- **Check bulkhead engine disconnect harness (CKT 14) at engine disconnect for electrical power.**
- **See Step (35) .**

TA249980

Symptom-1

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

11 **Check neutral shift switch for continuity.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Rear Grille Doors)

- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to one of the neutral shift switch connectors.
- Connect black probe to the other neutral shift switch connector.

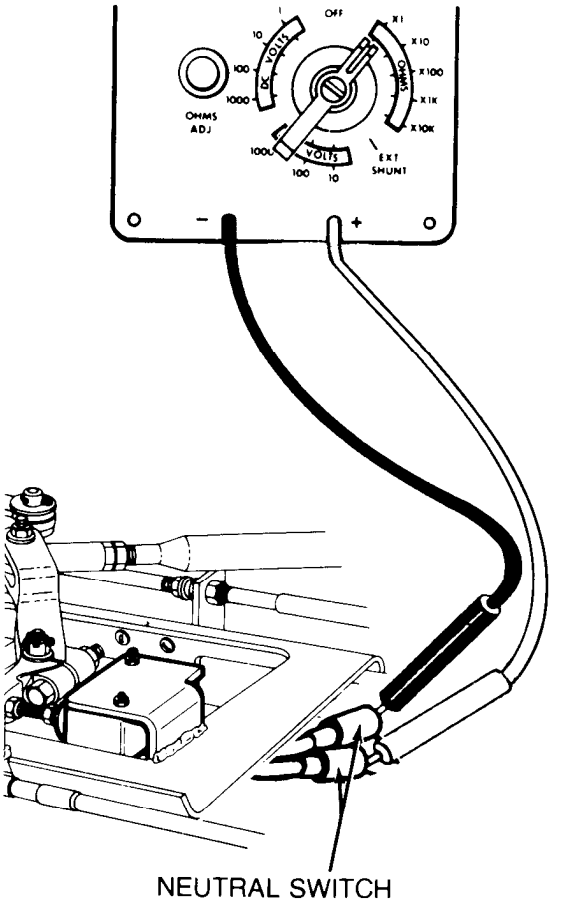
First Technician (Operator's Station)

- Move shift lever from L to N several times.

Second Technician (Rear Grille Doors)

- Check if meter indicates continuity each time the shift lever is moved to N.

Does meter indicate continuity each time the shift lever is moved to N.



YES

NO

12
- **Adjust neutral shift switch (page 11-80).**
- **If switch cannot be adjusted, replace neutral shift switch (page 10-236).**

TA249981

Symptom-1

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

WARNING

Use extreme care when working with circuit 81. This circuit carries battery voltage at all times whether MASTER BATTERY switch is ON or OFF.

13 Check starter feed harness (CKT 81), at engine disconnect, for electrical power.

Second Technician (Rear Grille Doors)

- Reconnect transmission harness connectors (CKT 14) to neutral shift switch connectors.

First Technician (Front of Crew Compartment)

- Disconnect three battery ground straps (page 10-268).

Second Technician (Top Deck)

- Disconnect starter feed harness connector from engine disconnect.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).

TA249982

Symptom-1 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

STEP (13) CONTINUED

First Technician (Front of Crew Compartment)

- Reconnect three battery ground straps (page 10-268).

Second Technician (Top Deck)

- Connect red probe of meter to contact B (CKT 81) at starter feed harness connector at engine disconnect and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.
- Repeat above check moving red probe of meter to contact E (CKT 81) at starter feed harness connector.

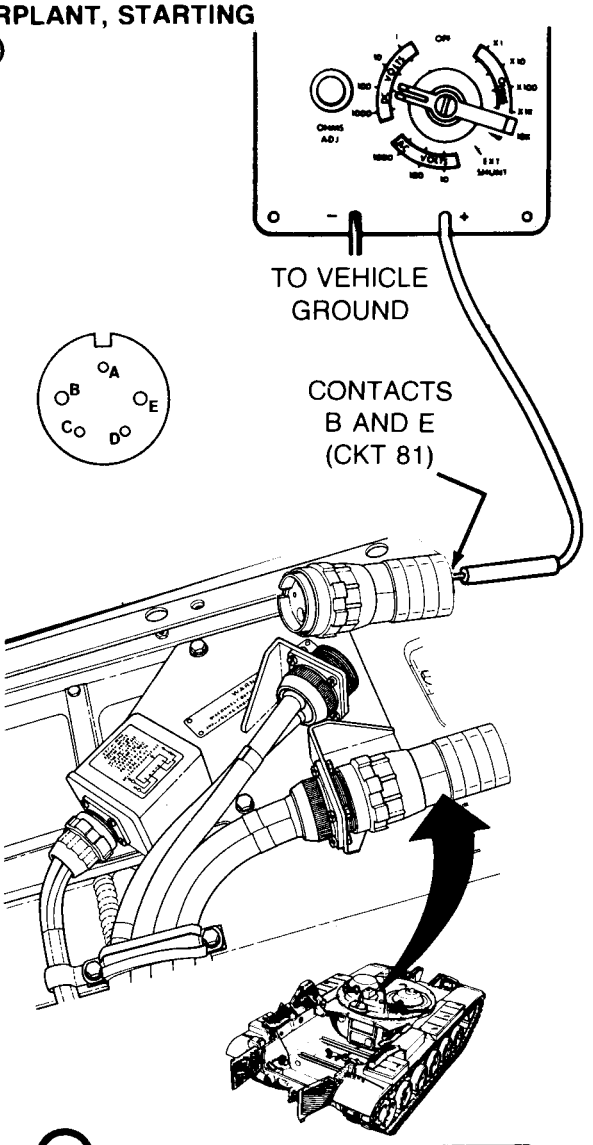
Does meter indicate 18 to 30 volts dc at contacts B and E?

YES

NO

14

- **Check battery cable (CKT 81) at bulkhead disconnect for electrical power.**
- **See Step (51) .**



TA249983

Symptom-1

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

15 **Check engine ground cable (CKT GND) at engine disconnect for continuity to ground.**

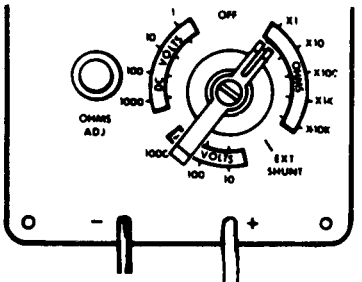
First Technician (Operator's Station)

- Disconnect three battery ground straps (page 10-268).

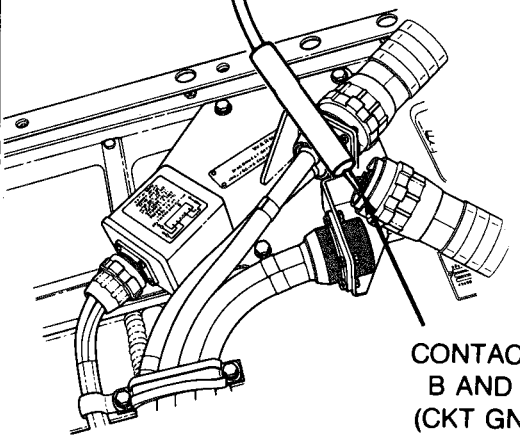
Second Technician (Top Deck)

- Reconnect starter feed harness connector to starter motor harness connector at engine disconnect.
- Disconnect engine ground cable connector from starter ground harness connector at engine disconnect.
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE Test No. 91 (page 4-89).
- Connect red probe of meter to contact B (CKT GND) of engine ground cable connector and black probe to ground.
- Check if meter indicates continuity.
- Repeat above check, moving red probe to contact E (CKT GND) of ground cable connector.

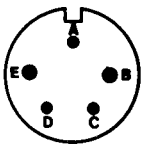
Does meter indicate continuity to ground at both connector contacts?



TO VEHICLE GROUND



CONTACTS B AND E (CKT GND)



YES

NO

16 **Replace engine ground cable (page 10-271).**

TA249984

Symptom-1

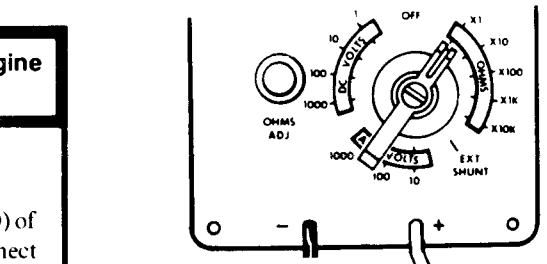
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

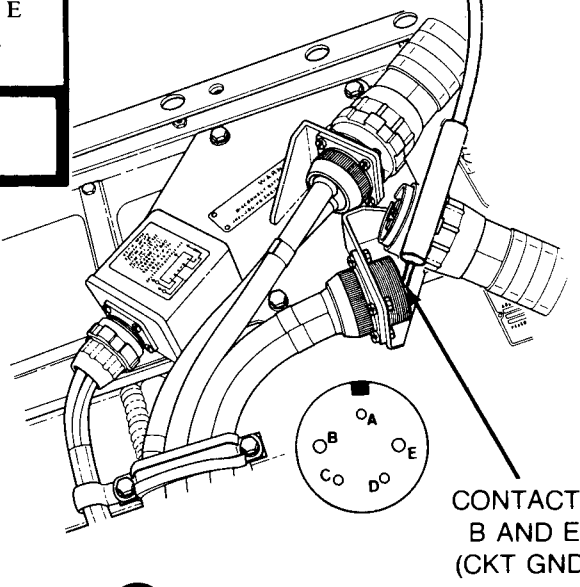
17 **Check starter ground harness (CKT GND) at engine disconnect for continuity to ground.**

Second Technician (Top Deck)

- Connect red probe of meter to contact B (CKT GND) of starter ground harness connector at engine disconnect and black probe to ground.
- Check if meter indicates continuity.
- Repeat above check, moving red probe to contact E (CKT GND) of starter ground harness connector.

Did meter indicate continuity at both contacts B and E?

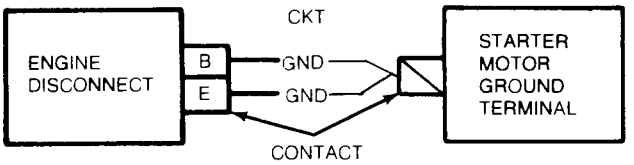




YES

NO

18 **Repair starter ground harness (CKT GND) (page 10-298).**



TA249985

Symptom-1

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

19 **Check for electrical power at starter solenoid (CKT 81).**

First Technician (Rear of Vehicle)

- Have powerplant removed (page 5-2).

Both Technicians (Powerplant)

- Install ground hop kit (page 5-25). Do not start engine.

Second Technician

- Reconnect three battery ground straps (page 10-268).

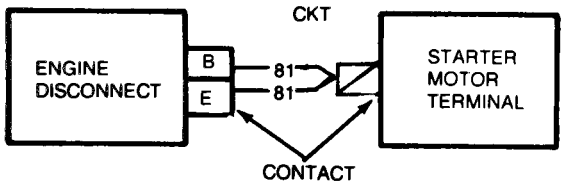
First Technician (Left Side of Engine)

- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to starter solenoid terminal (CKT 81) and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

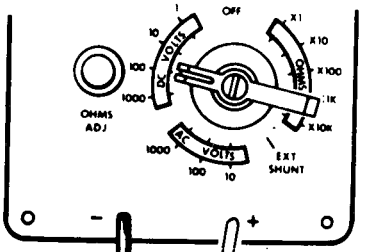
Does meter indicate 18 to 30 volts dc?

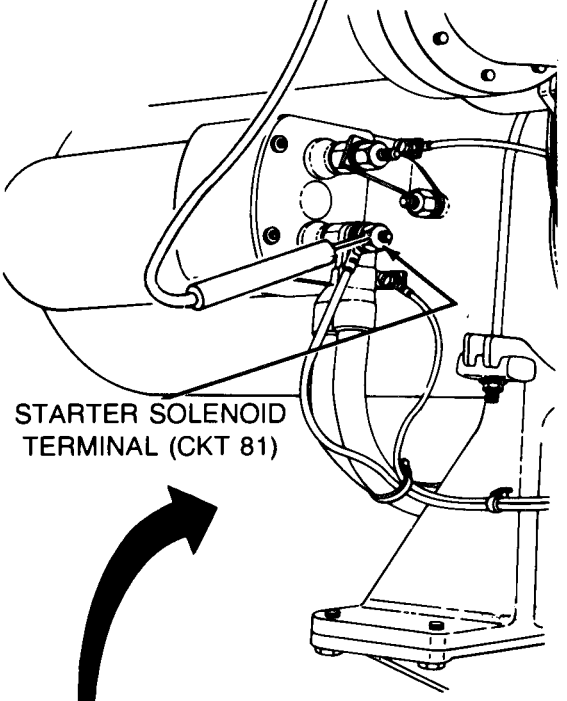
20 **Repair starter motor harness (page 10-298).**

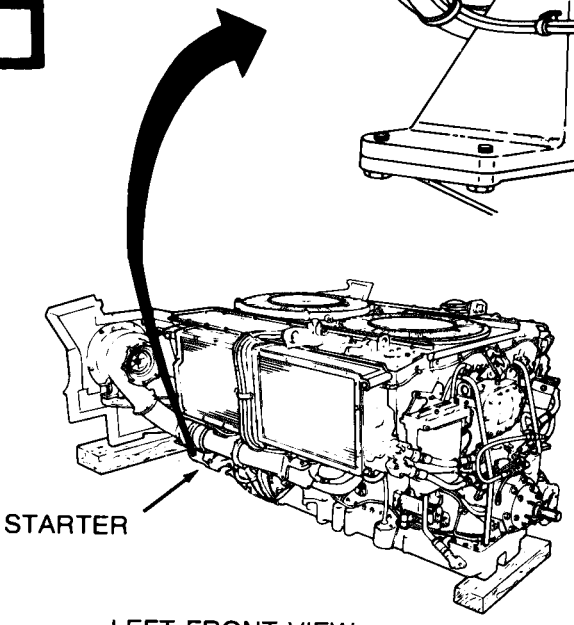
NO



YES







LEFT FRONT VIEW

TA249986

Symptom-1

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

21 **Check terminal A of starter solenoid for electrical power.**

First Technician (Left Side of Engine)

- Connect red probe of meter to terminal A at starter solenoid and black probe to ground.

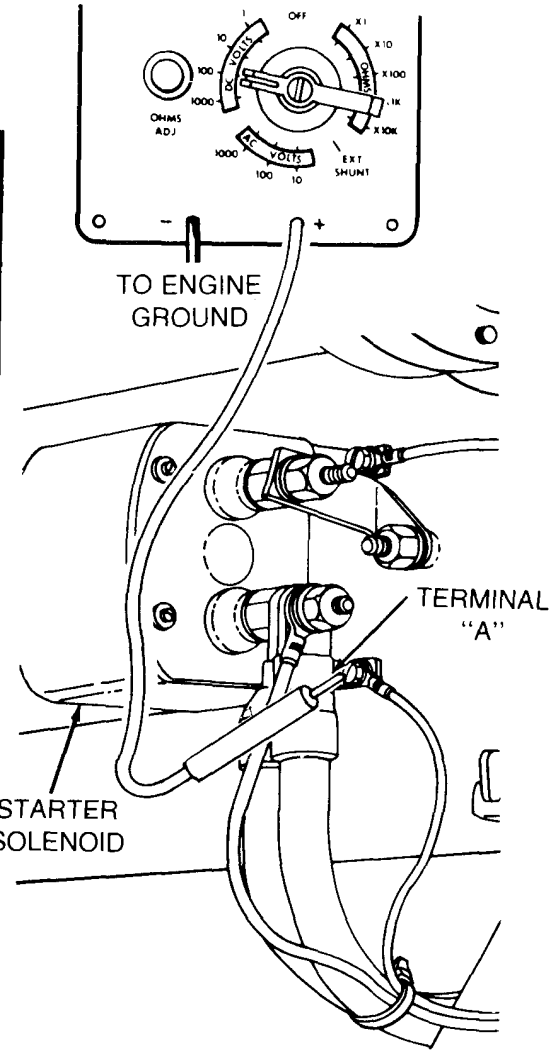
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and release STARTER switch.

First Technician (Left Side of Engine)

- Check if meter indicates 18 to 30 volts dc when the STARTER switch is pressed.

Did meter indicate 18 to 30 volts dc?



NO

YES

22 **Replace starter ((page 10-21)**

TA249987

Symptom-1

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

23 **Check engine electrical harness (CKT 14A) for continuity between starter solenoid terminal and low voltage protection connector contact D.**

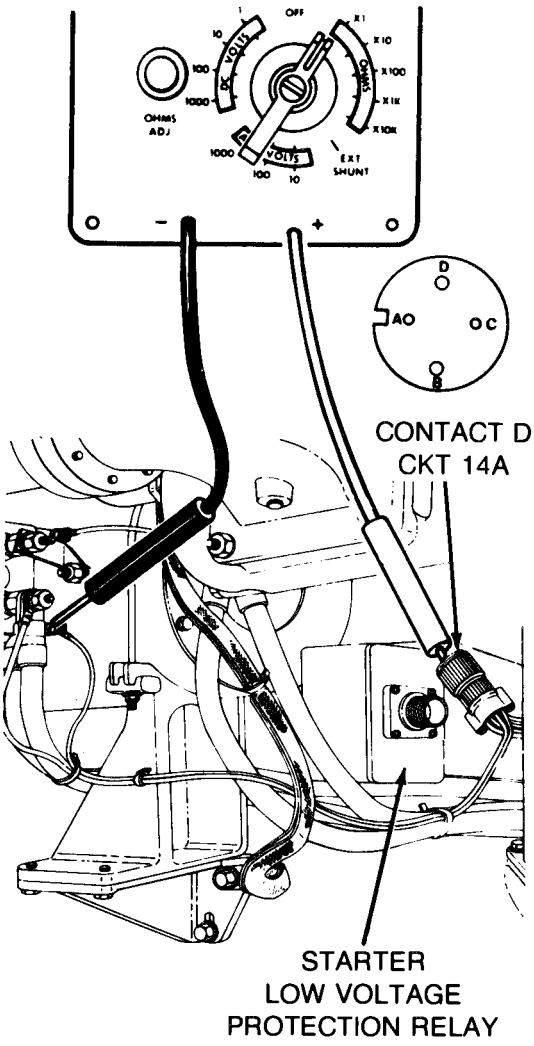
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect three battery ground straps (page 10-268).

First Technician (Left Side of Engine)

- Disconnect engine electrical harness connector from low voltage protection relay.
- Set multimeter on OHMS X1 scale and zero meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact D (CKT 14A) of engine harness connector at low voltage protection relay.
- Connect black probe of meter to terminal A (CKT 14A) of starter solenoid.
- Check if meter indicates continuity.

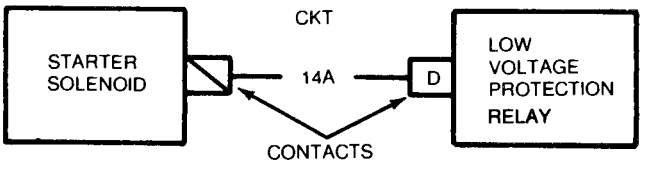
Does meter indicate continuity?



YES

NO

24 **Repair engine electrical harness (CKT 14A) (page 10-298).**



TA249988

Symptom-1

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

WARNING

Use extreme care when working with circuit 14A. This circuit carries battery voltage at all times whether MASTER BATTERY switch is ON or OFF.

25 **Check engine electrical harness (CKT 14A) at starter low voltage protection relay for electrical power.**

First Technician (Left Side of Engine)

- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact B (CKT 14A) of engine electrical harness connector and black probe to ground.

Second Technician (Operator's Station)

- Reconnect three battery ground straps (page 10-268).

First Technician (Left Side of Engine)

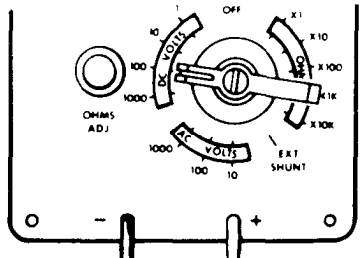
- Check if meter indicates 18 to 30 volts dc.

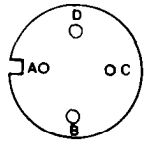
Does meter indicate 18 to 30 volts dc?

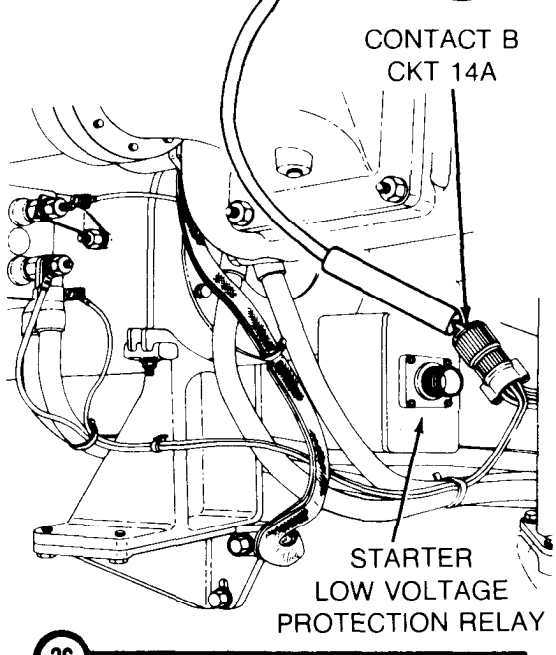
YES

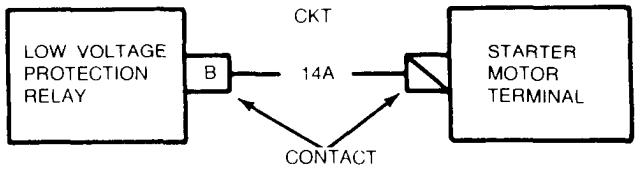
NO

26 **Repair engine electrical harness (CKT 14A) (page 10-298).**









TA249989

Symptom-1

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

27 **Check engine electrical harness (CKT 14) at starter low voltage protection relay for electrical power.**

First Technician (Left Side of Engine)

- Connect red probe of meter to contact A (CKT 14) of engine electrical harness connector and black probe to ground.

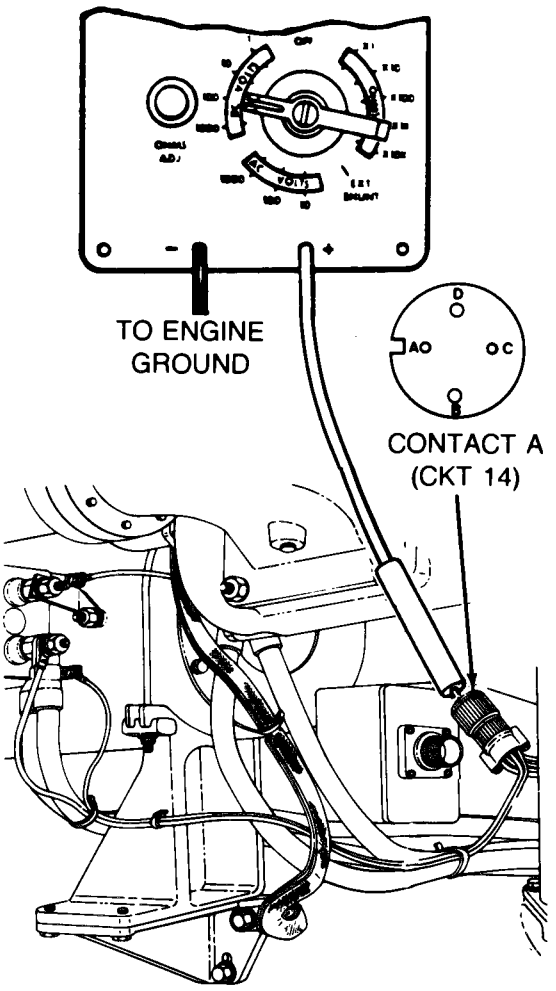
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and release STARTER switch.

First Technician (Left Side of Engine)

- Check if meter indicates 18 to 30 volts dc when STARTER switch is pressed.

Did meter indicate 18 to 30 volts dc?



28 **Replace low voltage protection relay (page 10-227).**

YES

NO

TA249990

Symptom-1

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

29 **Check engine electrical harness (CKT 14) for continuity from connector at starter low voltage relay to connector at transmission disconnect.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Left Side of Engine)

- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact A (CKT 14) of engine electrical harness connector at starter low voltage protection relay.

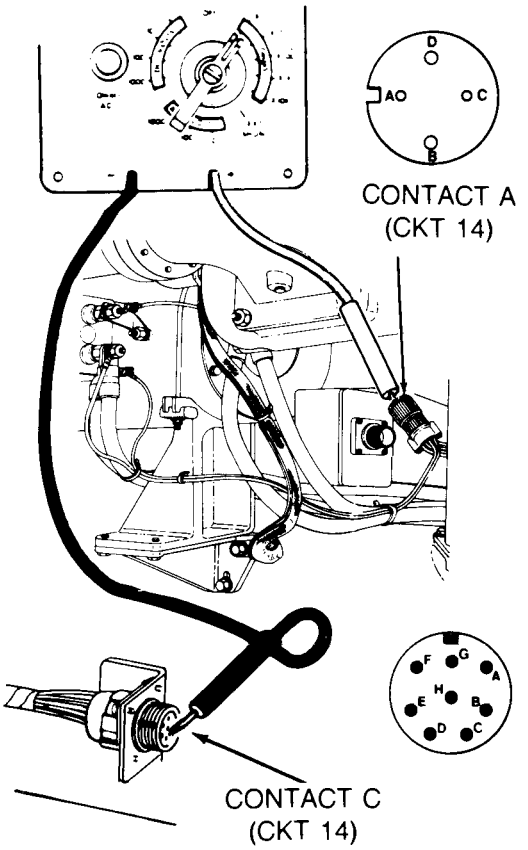
Second Technician (Right Side of Engine)

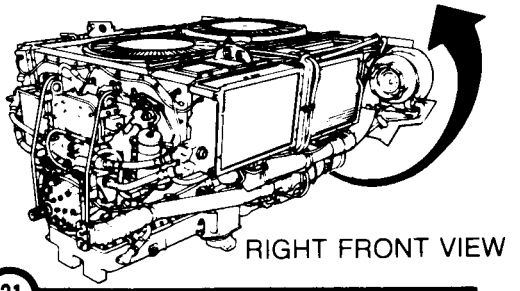
- Disconnect transmission harness connector from engine electrical harness connector at transmission disconnect.
- Connect black probe of meter to contact C of engine electrical harness connector at transmission disconnect.

First Technician (Left Side of Engine)

- Check if meter indicates continuity.

Does meter indicate continuity?



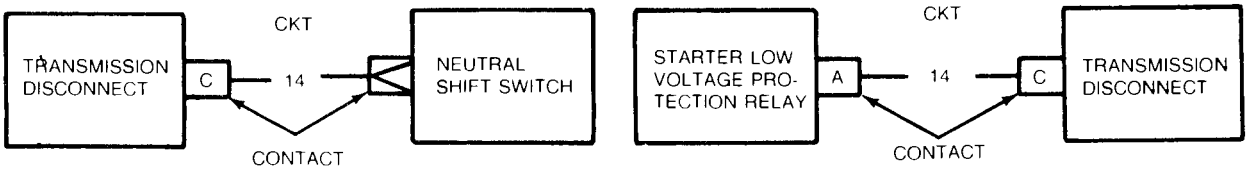


YES

30
- **Repair transmission harness (CKT 14) (page 10-298).**
- **Reconnect engine electrical harness connector to low voltage protection relay connector.**
- **Install powerplant (page 5-14).**

NO

31
- **Repair engine electrical harness (CKT 14) (page 10-298).**
- **Install powerplant (page 5-14).**



TA249991

Symptom-1

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FROM STEP 6

32 Check for locked engine.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Top Deck)

- Have powerplant removed (page 5-2).

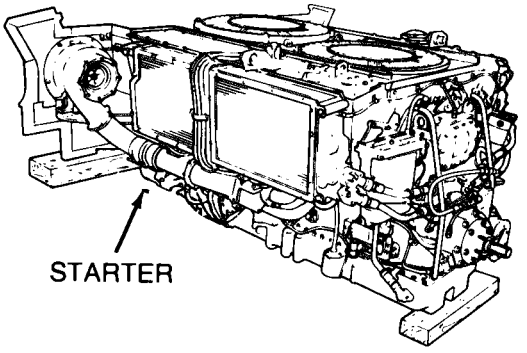
Both Technicians (Powerplant)

- Replace starter (page 10-21).
- Install ground hop kit (page 5-25). Do not start engine.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and release STARTER switch.

Does engine crank?



POWERPLANT

NO → **33 Notify support maintenance of locked engine.**

YES → **34**

- **Condition corrected by replacing starter.**
- **Have powerplant installed (page 5-14).**

TA249992

Symptom-1

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FROM STEP (10)

(35) Check bulkhead engine disconnect harness (CKT 14) at engine disconnect for electrical power.

Second Technician (Rear Grille Doors)

- Reconnect both transmission harness connectors (CKT 14) to neutral shift switch connectors.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Top Deck)

- Open left top deck grille doors.
- Disconnect bulkhead engine disconnect harness connector (CKT 14) from engine electrical harness connector at engine disconnect.
- Connect red probe of meter to contact M (CKT 14) of bulkhead engine disconnect harness connector and black probe to ground.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and release starter switch.

Second Technician (Top Deck)

- Check if meter indicates 18 to 30 volts dc when starter switch is pressed.

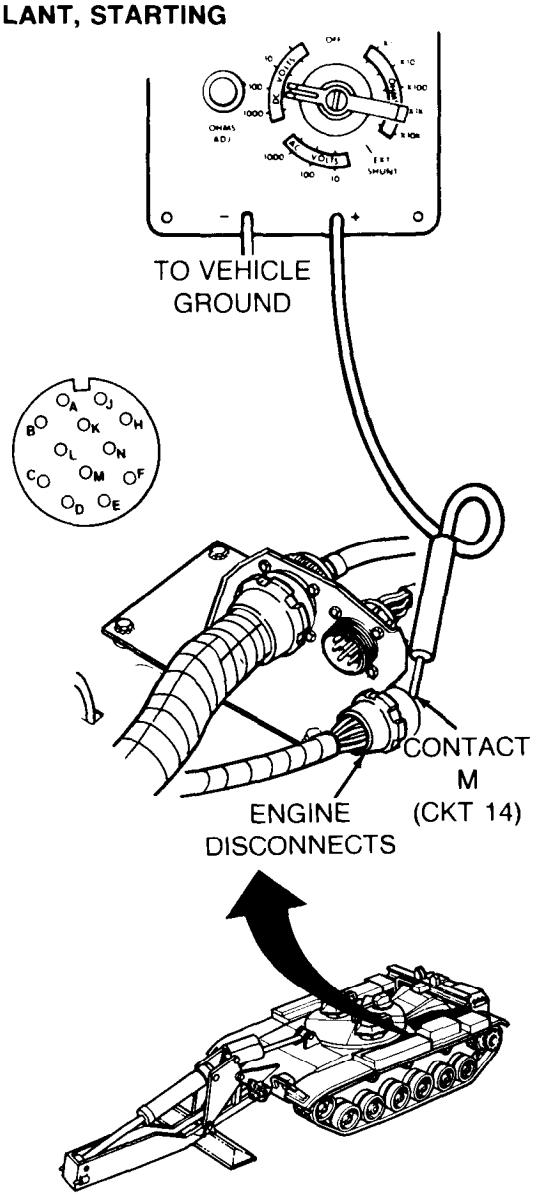
Does meter indicate 18 to 30 volts dc?

NO

YES

(36) Check engine electrical harness (CKT 14) for continuity from connector at engine disconnect to connector at transmission disconnect.

See Step (48) .



TA249993

Symptom-1

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

37 **Check front accessory harness (CKT 14) at bulkhead disconnect for electrical power.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Top Deck)

- Connect bulkhead engine disconnect harness connector to engine disconnect.

Both Technicians (Rear Grille Doors)

- Install transmission shroud.

Second Technician (Commander's Station)

- Displace front accessory harness connector (CKT 14) from bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact M (CKT 14) of front accessory harness connector at bulkhead disconnect and black probe to ground.

First Technician (Operator's Station)

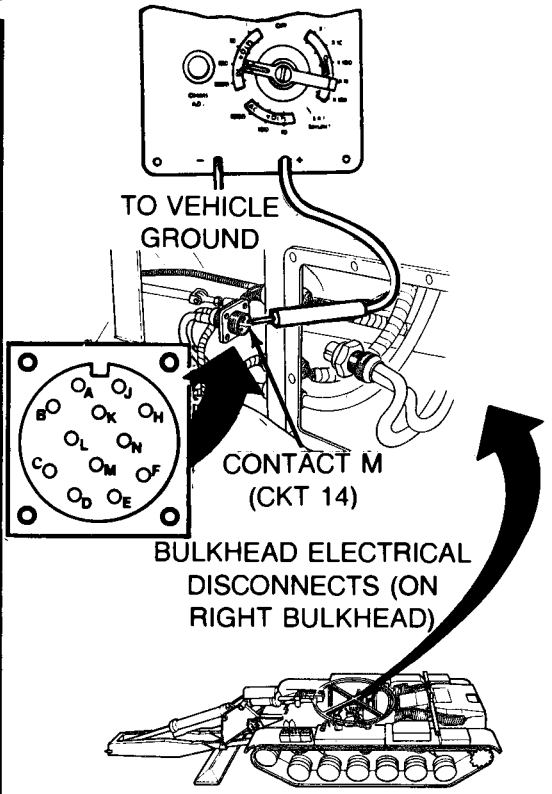
- Set MASTER BATTERY switch ON.
- Press and release STARTER switch.

Second Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc when starter switch is pressed.

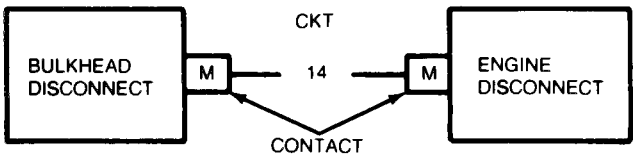
Does meter indicate 18 to 30 volts dc?

NO **YES**



38

- **Inspect bulkhead engine disconnect harness for bent/ broken connector contacts or loose CKT 14 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**



TA249994

Symptom-1

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

39 **Check basket-control panel accessories harness (CKT 14) at basket disconnect for electrical power.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Commander's Station)

- Displace basket-control panel accessories harness (CKT 14) at basket disconnect (page 10-269).
- Connect red probe of meter to contact J (CKT 14) of basket-control panel accessories harness connector at basket disconnect and black probe to ground.

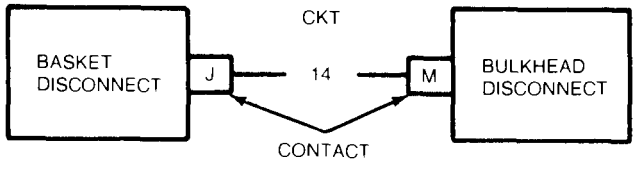
First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and release STARTER switch.

Second Technician (Commander's Station)

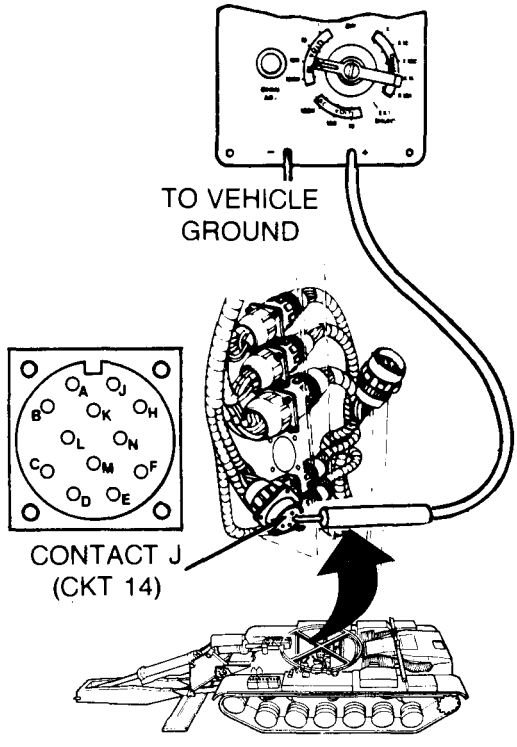
- Check if meter indicates 18 to 30 volts dc when starter switch is pressed.

Does meter indicate 18 to 30 volts dc?



NO

YES



40

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 14 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Install front accessory harness connector to bulkhead disconnect (page 10-270).**
- **Install basket-control panel accessories harness connector at basket disconnect (page 10-270).**

TA249995

Symptom-1

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

41 **Check at master control panel accessories harness connector (CKT 14) for electrical power.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).
- Install basket-control panel accessories harness connector at basket disconnect (page 10-270).

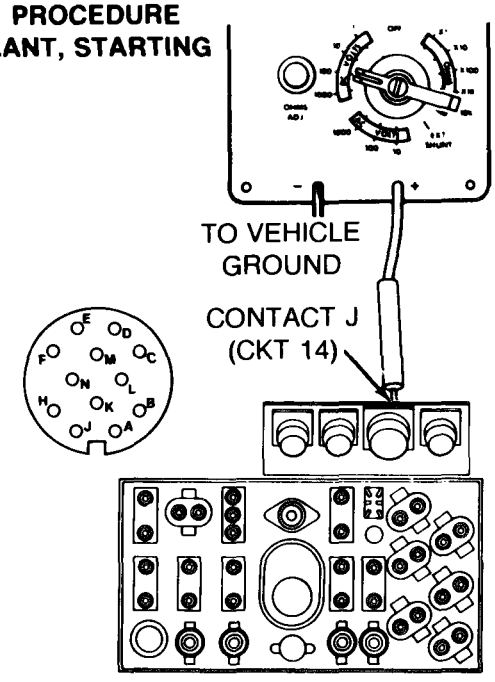
First Technician (Operator's Station)

- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness connector (CKT 14) at master control panel.
- Connect red probe of meter to contact J (CKT 14) of master control panel accessories harness connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Press and release STARTER switch.
- Check if meter indicates 18 to 30 volts dc when starter switch is pressed.

Does meter indicate 18 to 30 volts dc?

NO

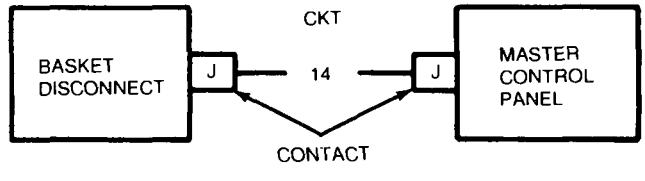
YES



MASTER CONTROL PANEL (REAR VIEW)

42

- **Inspect basket-control panel accessories harness for bent/broken connector contacts or loose CKT 14 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-control panel accessories harness.**
- **Connect basket-control panel accessories harness connector to master control panel.**
- **Install master control panel (page 10-33).**



TA249996

Symptom-1

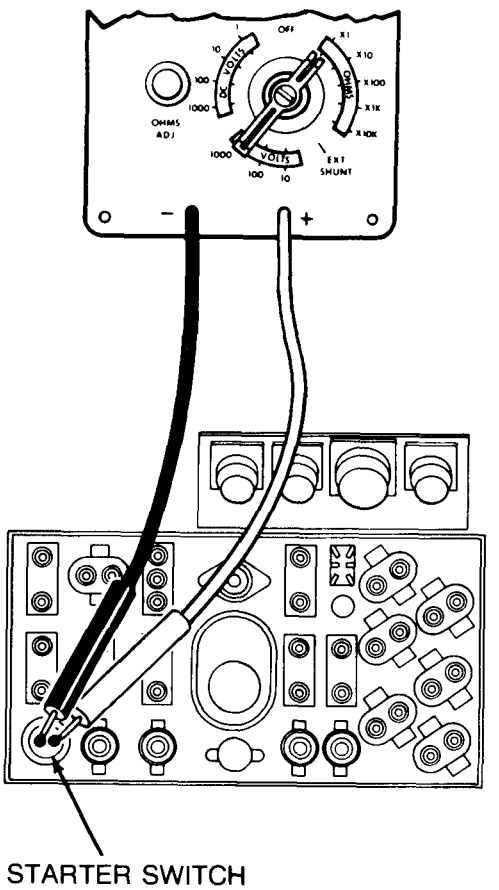
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

43 **Check STARTER switch for continuity.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect master control panel power harness connector (CKT 14) from STARTER switch.
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to one contact and black probe to other contact of starter switch.
- Press and release STARTER switch.
- Check if meter indicates continuity while STARTER switch is pressed.

Does meter indicate continuity.?



YES

NO

44

- **Replace starter switch (page 10-38).**
- **Connect basket-control panel accessories harness connector to master control panel.**

TA249997

Symptom-1

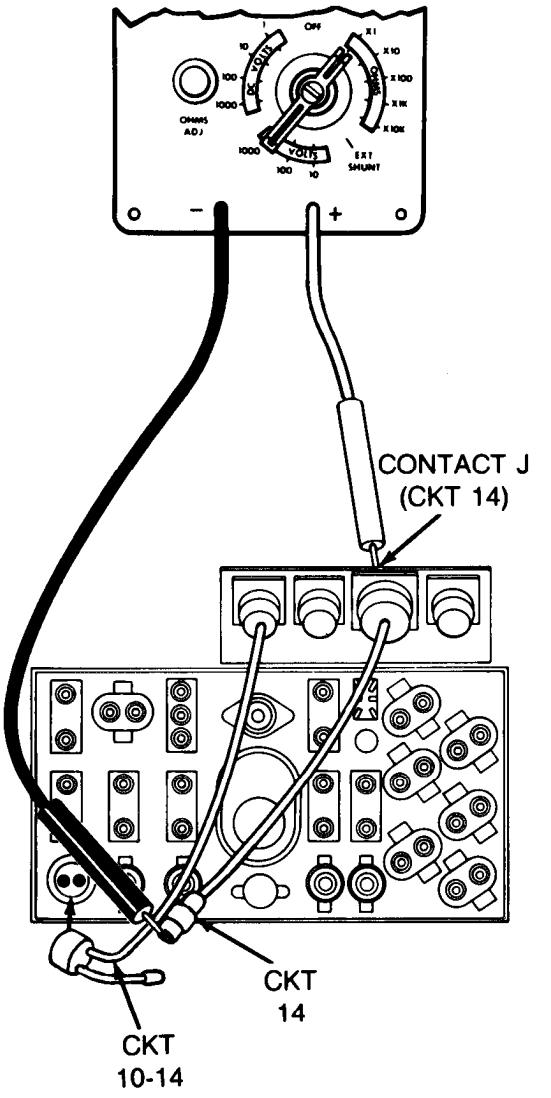
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

45 **Check master control panel accessories harness from intermediate connector to panel connector for continuity.**

First Technician (Operator's Station)

- Disconnect master control panel accessories harness intermediate connector (CKT 14) from master control panel power harness.
- Connect red probe of meter to contact J (CKT 14) of accessories harness panel connector.
- Connect black probe of meter to intermediate connector (CKT 14).
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

46
- **Replace master control panel power harness (page 10-38).**
- **Connect basket-control panel accessories harness to master control panel.**

NO

47 **Replace master control panel accessories harness (page 10-38).**

TA249998

Symptom-1 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FROM STEP 36

48 **Check engine electrical harness (CKT 14) for continuity from connector at engine disconnect to connector at transmission disconnect.**

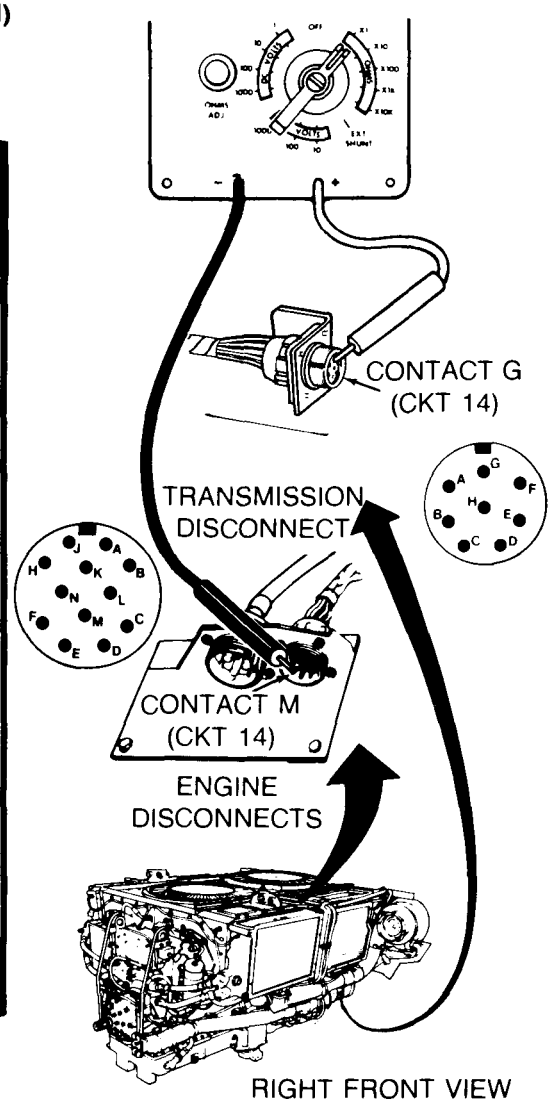
Second Technician (Rear of Vehicle)

- Have powerplant removed (page 5-2).

First Technician (Right Side of Engine)

- Disconnect engine electrical harness connector at transmission disconnect.
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact G (CKT 14) of engine electrical harness connector at transmission disconnect.
- Connect black probe of meter to contact M (CKT 14) of engine electrical harness connector at engine disconnect.
- Check if meter indicates continuity.

Does meter indicate continuity?

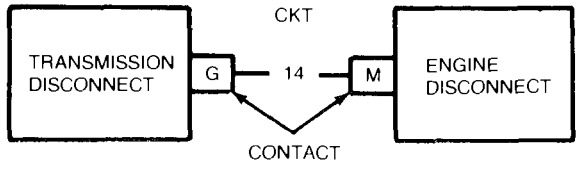


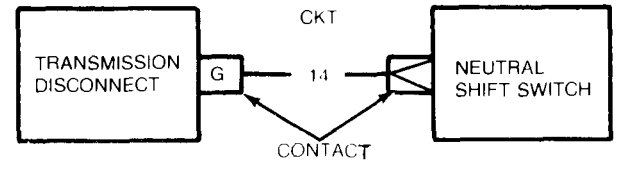
49 **Repair engine electrical harness (CKT 14) (page 10-298).**

NO

YES

50 **Repair transmission harness (CKT 14) (page 10-298).**





TA249999

Symptom-1

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FROM STEP (14)

WARNING

Use extreme care when working with circuit 81. This circuit carries battery voltage at all times whether MASTER BATTERY switch is ON or OFF.

(51) Check battery cable (CKT 81) at bulkhead disconnect for electrical power.

First Technician (Operator's Station)

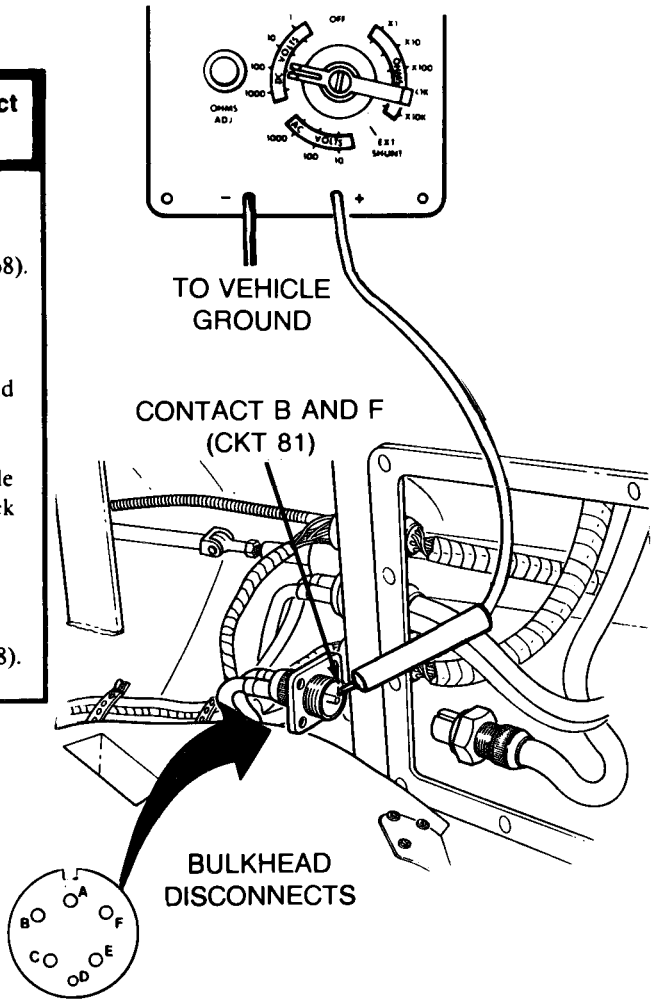
- Disconnect three battery ground straps (page 10-268).

Second Technician (Commander's Station)

- Disconnect battery cable connector from bulkhead disconnect.
- Connect red meter probe to contact B of battery cable connector at bulkhead electrical disconnect and black probe to ground.

First Technician (Operator's Station)

- Reconnect three battery ground straps (page 10-268).



TA250000

Symptom-1 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

STEP (51) CONTINUED

Second Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.
- Move red probe of meter from contact B to contact F of battery cable connector at bulkhead electrical disconnect.
- Check if meter indicates 18 to 30 volts dc.

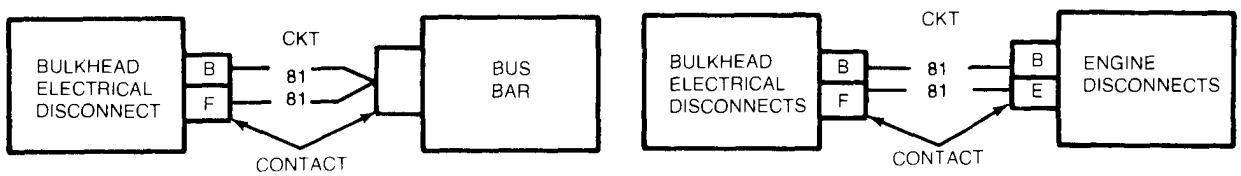
Does meter indicate 18 to 30 volts dc at both connector contacts?

NO

(52)
- **Repair battery cable (CKT 81) (page 10-298).**
- **Connect starter feed harness connector at engine disconnect.**

YES

(53)
- **Repair starter feed harness (CKT 81) (page 10-298).**



TA250001

Symptom-1 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FROM STEP 2

54 **Check if MASTER BATTERY indicator lamp lights.**

First Technician (Operator's Station)

- Check if MASTER BATTERY indicator lamp lights when MASTER BATTERY switch is set ON.

Does master battery indicator lamp light?

YES → **55** **See Symptom 27: NO POWER DISTRIBUTION FROM MASTER RELAY (MASTER BATTERY INDICATOR LAMP WILL LIGHT).**

NO → **56** **See Symptom 28: NO POWER IN VEHICLE (MASTER BATTERY INDICATOR LAMP WILL NOT LIGHT).**

TA250002

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING

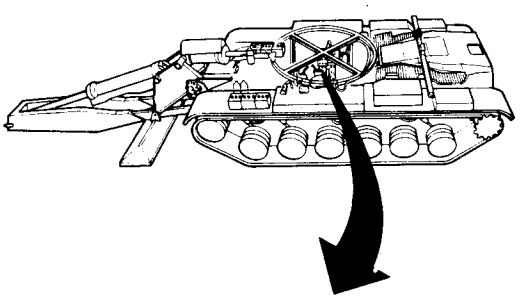
Symptom-2

ENGINE CRANKS AT NORMAL SPEED, BUT WILL NOT START (BATTERY/GENERATOR GAGE SHOWS IN YELLOW AREA).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



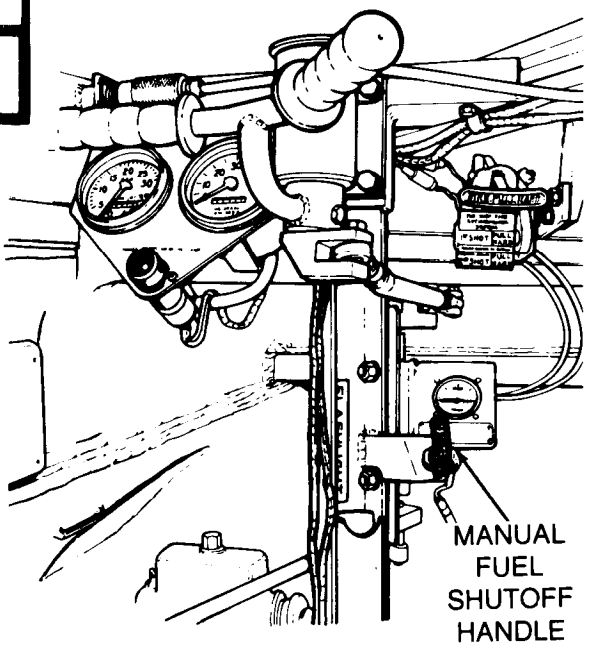
OPERATOR'S STATION

1 Check if manual fuel shutoff handle is in the down (ON) position.

Second Technician (Operator's Station)

- Release spring latch on fuel shutoff handle.
- Operate handle several times and leave in the down (ON) position.
- Place latch over fuel shutoff handle.

Did manual fuel shutoff handle go freely to the down (ON) position?



2 See Symptom 18: MANUAL FUEL SHUTOFF HANDLE WILL NOT STOP ENGINE.

NO

YES

TA250003

Symptom-2 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

3 **Check if fuel tanks electrical fuel pumps are running.**

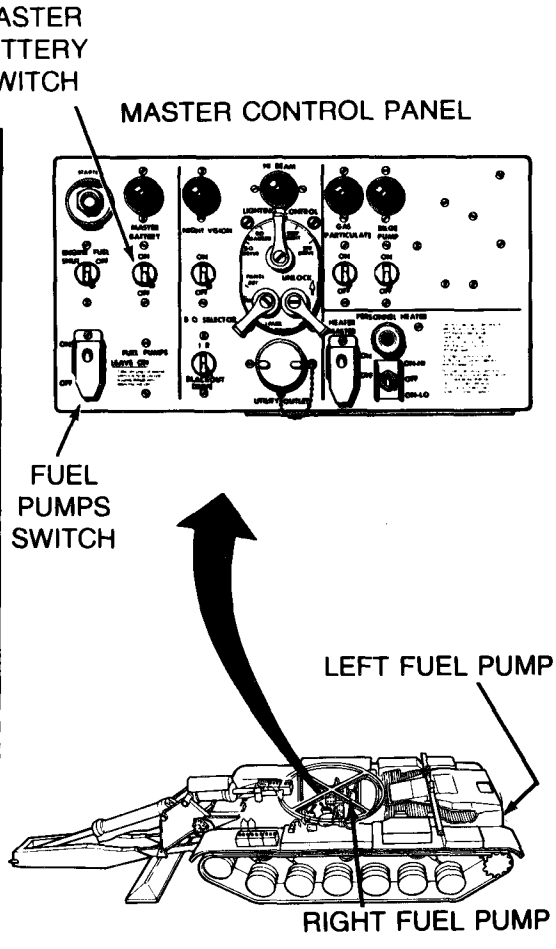
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.
- Listen for sound of right fuel tank electrical fuel pump running.

First Technician (Rear Grille Doors)

- Open rear grille doors.
- Listen for sound of left fuel tank electrical fuel pump running.

Are both fuel tanks electrical fuel pumps running?



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

YES

NO

4

- **If only one pump is not running, See Symptom 5: ONE ELECTRICAL FUEL PUMP WILL NOT WORK.**
- **If both pumps are not running, See Symptom 6: BOTH ELECTRICAL FUEL PUMPS WILL NOT WORK.**

TA250004

Symptom-2

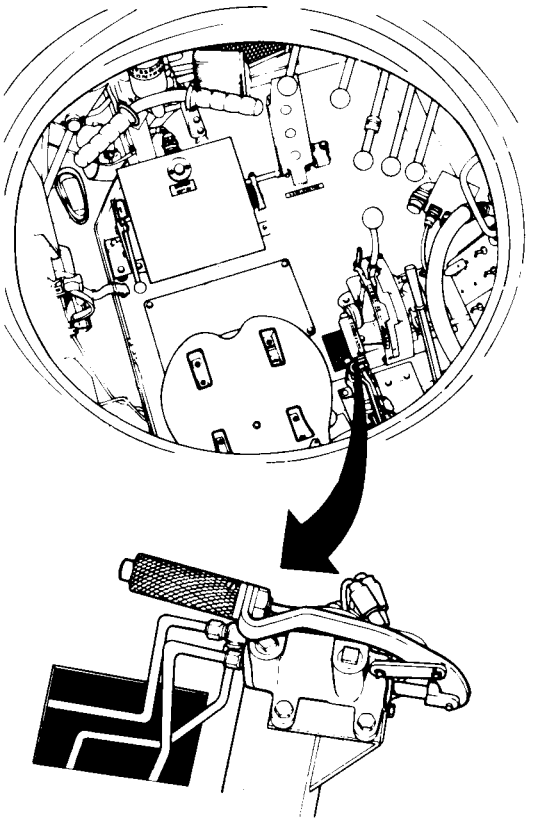
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

5 **Check primer pump for back pressure.**

Second Technician (Operator's Station)

- Operate primer pump handle several times.

Does primer pump feel like it is pumping?



PRIMER PUMP

YES

NO

6 **See Symptom 7: PRIMER PUMP WILL NOT WORK.**

TA2500(

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

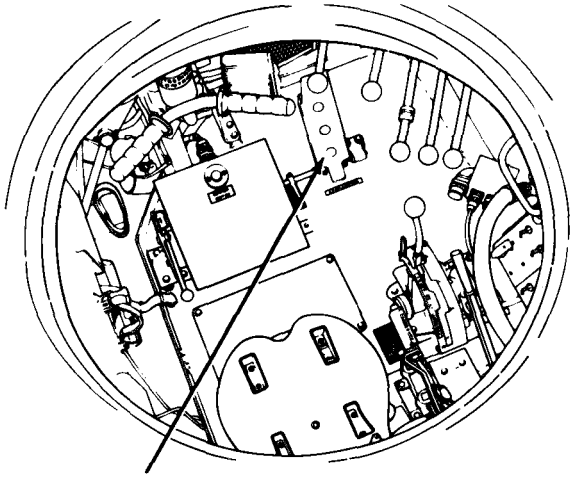
7 **Check accelerator pedal for freedom of movement.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Press and release accelerator pedal several times.

Does accelerator pedal operate freely without binding.

OPERATOR'S STATION



YES

NO

8

- **Check for binding at accelerator pedal.**
- **See Step (47) .**

TA250006

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

9 **Check for accelerator linkage movement at front of engine.**

First Technician (Rear of Crew Compartment)

- Remove upper engine access panel (page 17-11).
- Observe idle adjusting screw for full movement off the stop when accelerator pedal is pressed.

Second Technician (Operator's Station)

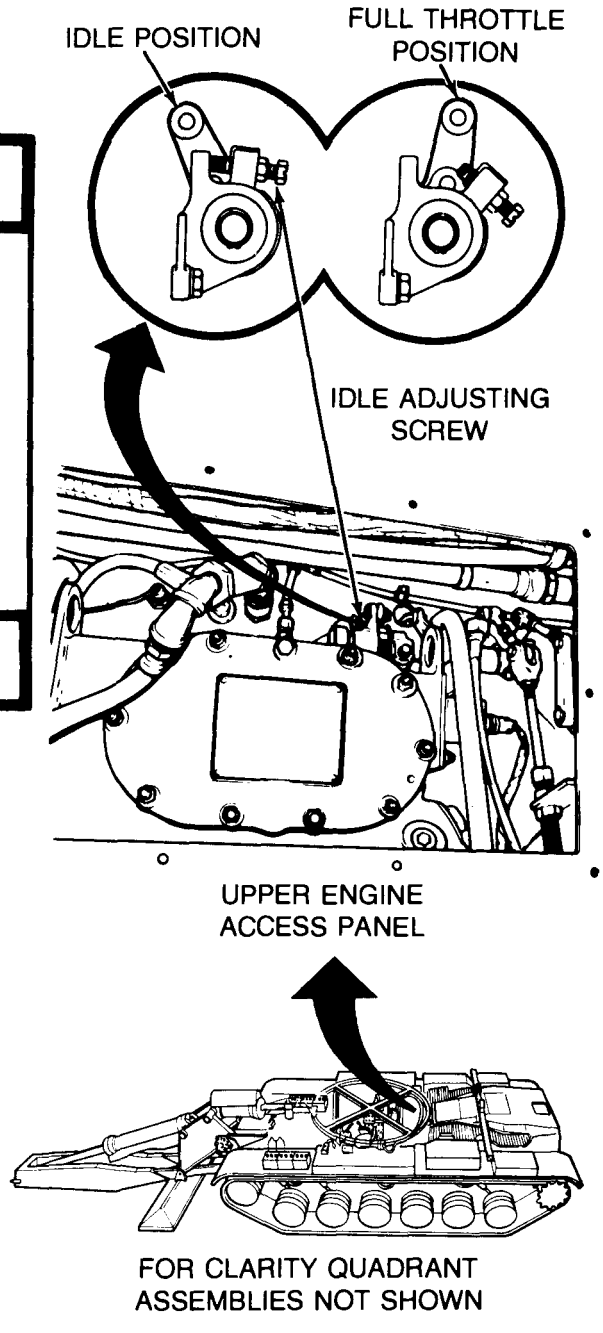
- Press accelerator pedal all the way down and release.

Does idle adjustment screw move to full throttle position?

10 **Check for movement of throttle stop pin at engine.**

See Step (59) . — NO

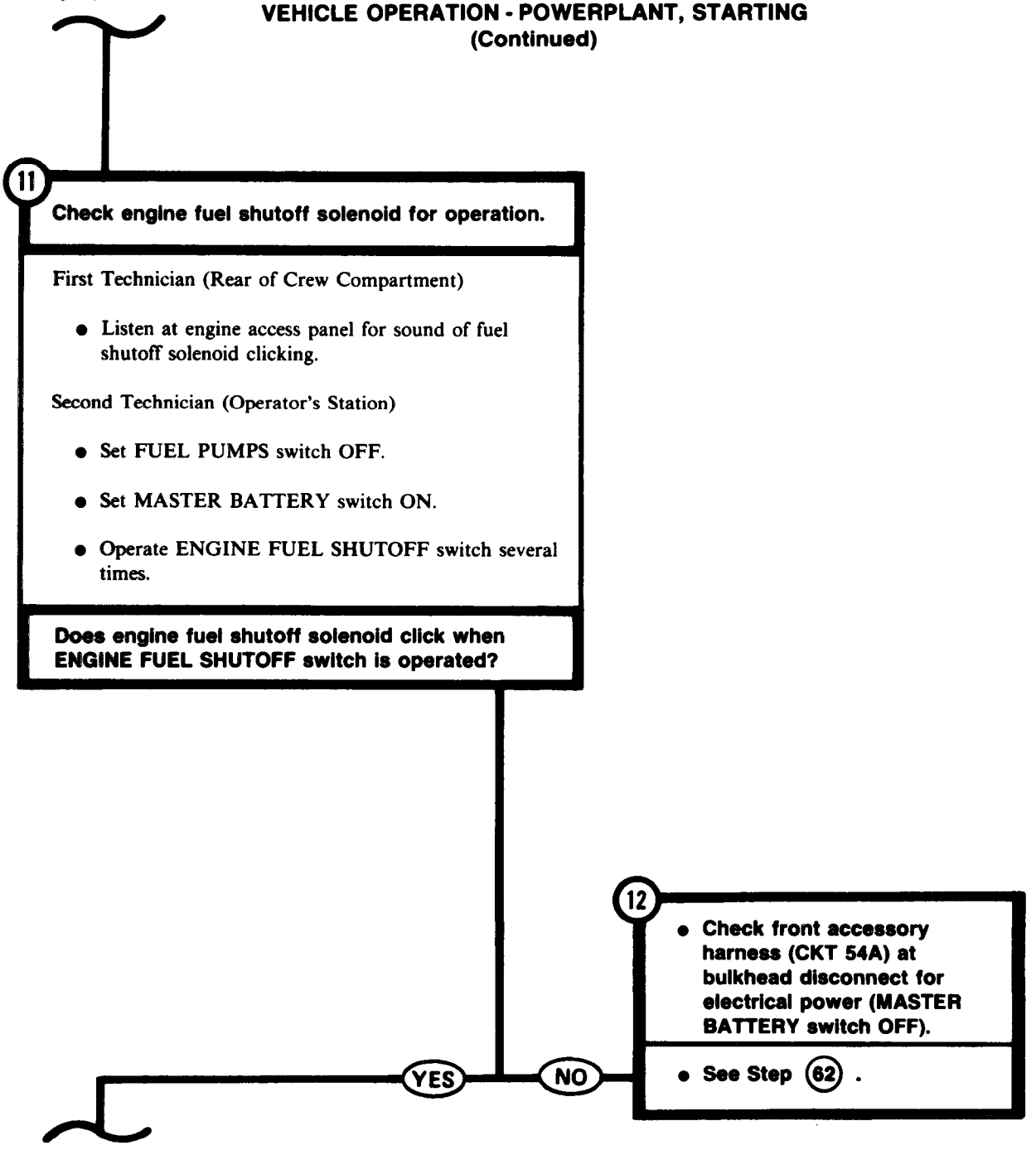
YES



TA250007

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)



TA250008

Symptom-2 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

13 **Check for fuel flow at main fuel return line quick disconnect.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

First Technician (Rear Grille Doors)

- Disconnect main fuel return line quick disconnect.
- Remove quick disconnect half from fuel line coming from engine.
- Place one gallon container under open line to catch any fuel.

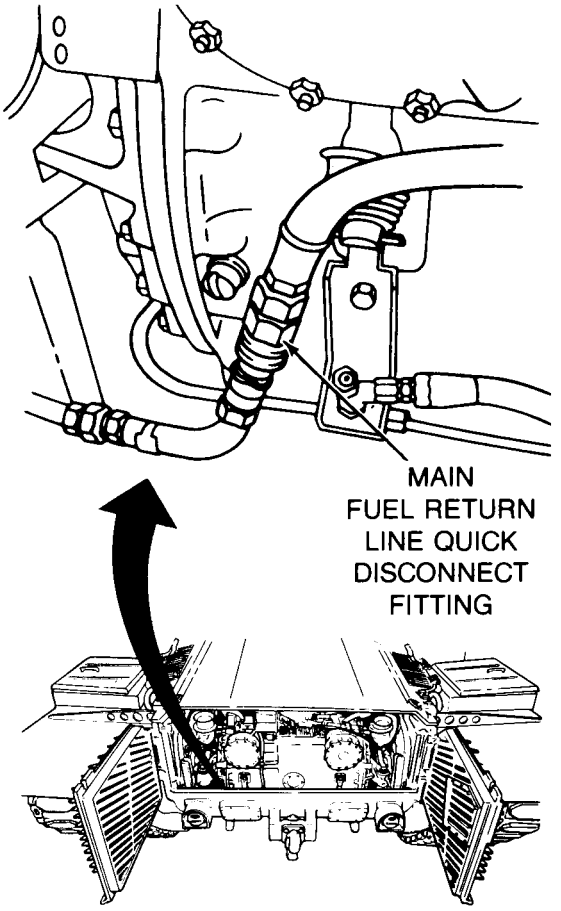
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.

First Technician (Rear Grille Doors)

- Observe return line for free fuel flow.
- Direct second technician to set MASTER BATTERY and FUEL PUMPS switches OFF.

Does fuel flow freely from main fuel return line?



REAR OF ENGINE (TRANSMISSION SHROUD REMOVED)

YES

NO

14

- **Check for free fuel flow from main fuel supply line quick disconnect (located behind upper engine access panel).**
- **See Step (26) .**

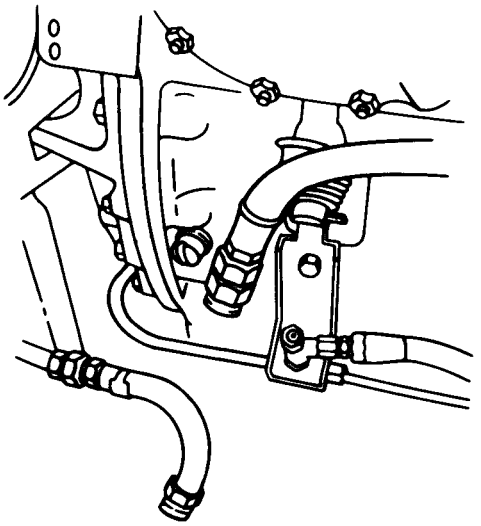
TA250009

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

NOTE

Diesel fuel containing water will be milky. The water will settle out in a short period of time.



15 Check for water in fuel.

First Technician (Rear Grille Doors)

- Place one gallon container under open fuel return line to catch fuel.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.

First Technician (Rear Grille Doors)

- Allow contiiner to fill with fuel then direct second technician to set MASTER BATTERY and FUEL PUMPS switches OFF.
- Observe for water (fuel is milky).

Does fuel contain water?

NO

YES

16

- **See Symptom 10: FUEL/WATER SEPARATOR WILL NOT WORK.**
- **Install quick disconnect on fuel return line and connect line.**

TA25001

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

WARNING

Do not touch manifold heaters with bare hands.

17 **Check intake manifold preheaters for operation.**

Both Technicians (Rear Grille Doors)

- Install quick disconnect and connect fuel return line.
- Install transmission shroud (page 9-6).

First Technician (Top Deck)

- Open left and right top grille doors.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.
- At the same time, press STARTER switch, MANIFOLD PREHEAT switch, and operate PRIMER PUMP. Do not hold switches on for more than 14 seconds.

First Technician (Top Deck)

- Reach down through grille door openings and feel for heat from intake manifold preheaters.

Are both intake manifold preheaters warm?

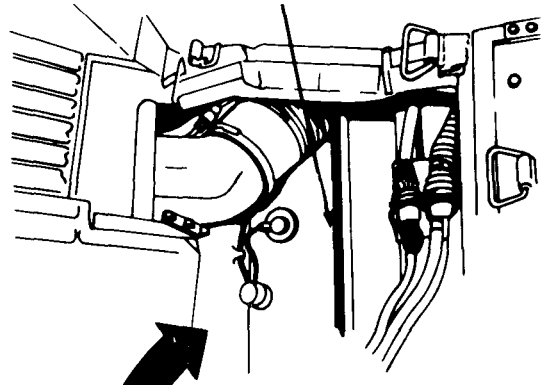
YES

NO

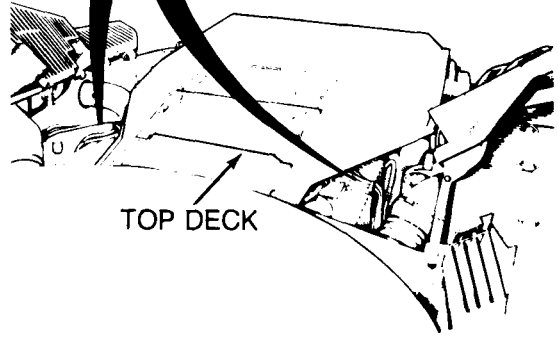
18

- **If both preheaters are cold, see Symptom 9: BOTH INTAKE MANIFOLD PREHEATERS WILL NOT WORK.**
- **If only one preheater is cold, see Symptom 8: ONE INTAKE MANIFOLD PREHEATER WILL NOT WORK.**

ACCESS TO INTAKE MANIFOLD PREHEATER (HIDDEN)



VIEW THROUGH LEFT GRILLE DOORS (LEFT SIDE SHOWN)



TA250011

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

NOTE

There are two sets of air cleaning components which are the same and are located across from one another on each side of the engine.

19 **Check engine air intake screens for clogging or damage.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Gain access to left air intake screen.

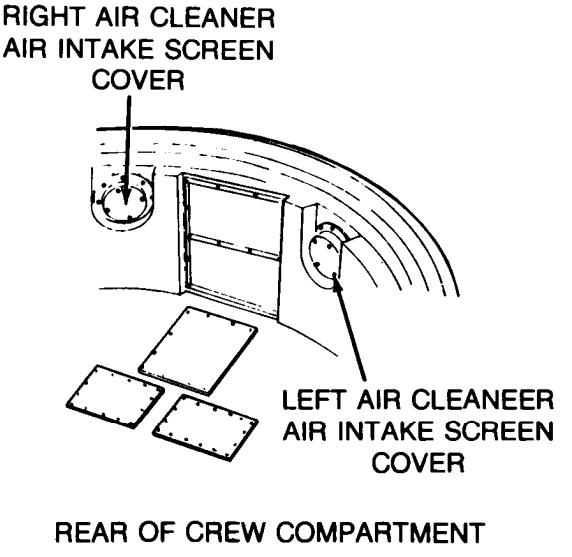
First Technician (Commander's Station)

- Gain access to right air intake screen.

Both Technicians (Air Intake Screens)

- Inspect air intake screens for clogging or damage.

Are engine air intake screens clogged or damaged?



NO

YES

20 **Clean engine air intake screens or replace damaged screens.**

TA250012

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

21 **Check engine air cleaner for collapsed hoses.**

Both Technicians (Air Intake Screens)

- Install air intake screen covers.

Second Technician (Top Deck)

- Check both right and left intake hoses and outlet hoses for collapsing or other damage.

Are engine air cleaning hoses collapsed or damaged?

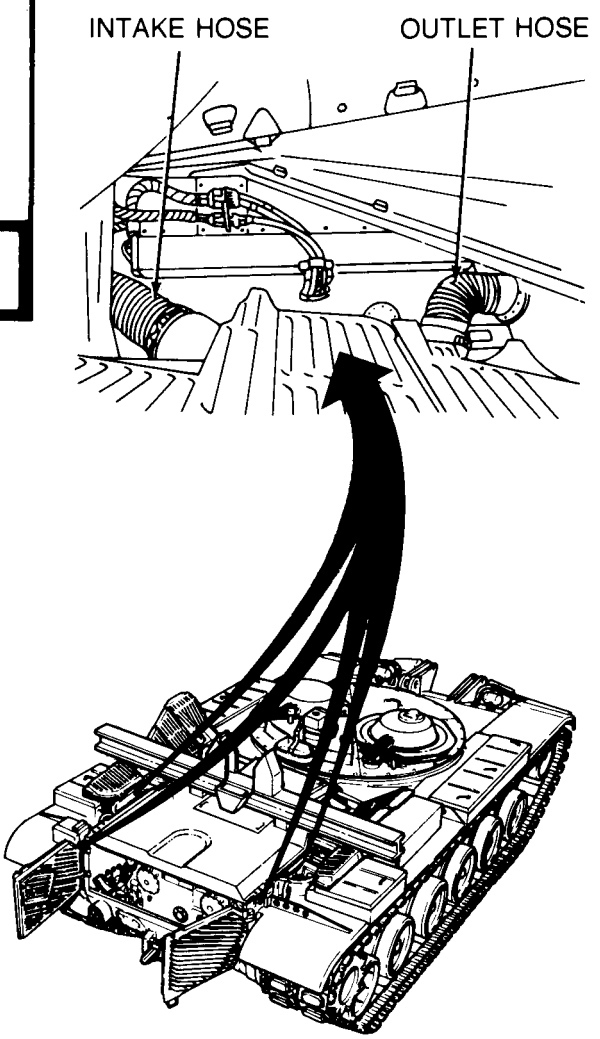
YES

22 **Replace engine air intake and/or air outlet hoses (page 7-79).**

NO

(VIEW LOOKING DOWN THROUGH LEFT TOP DECK GRILLE DOORS)

(LEFT SIDE SHOWN)



TA250013

Symptom-2

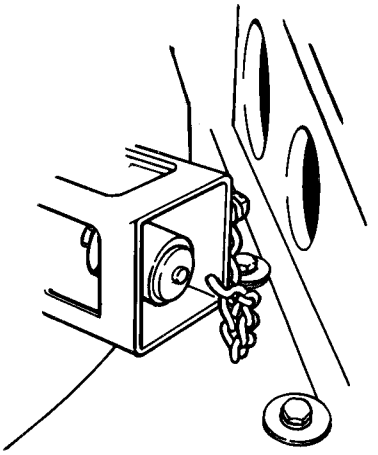
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

23 **Check if engine air cleaner filters, on each side of vehicle, are clogged.**

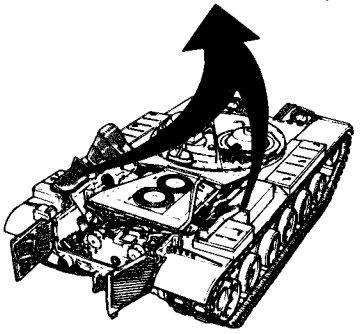
Second Technician (Top Deck)

- Check engine air cleaner restriction indicator on each side of vehicle for clogged filters (TM 5-5420-202-20).

Are engine air cleaner filters clogged?



AIR CLEANER RESTRICTION INDICATOR
(LEFT SIDE SHOWN)



NO → **25** **Notify support maintenance that engine cranks but will not start.**

YES → **24** **Remove and service engine air cleaner filters (page 7-91).**

TA250014

Symptom-2 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FROM STEP (14)

(26) Check for free fuel flow from main fuel supply line quick disconnect (located behind upper engine access panel).

First Technician (Rear Grille Doors)

- Install quick disconnect and connect fuel return line.

First Technician (Rear of Crew Compartment)

- Disconnect main fuel line quick disconnect.
- Place a suitable container under the line to catch any fuel.
- Push in (and hold) on the center of the female quick disconnect.

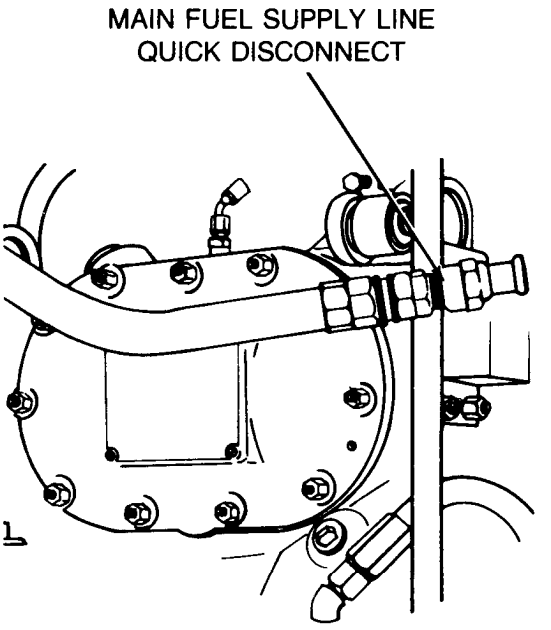
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch on for approximately 10 seconds then set FUEL PUMPS switch OFF.

First Technician (Rear of Crew Compartment)

- Check for free fuel flow from main fuel line quick disconnect.

Did fuel flow freely from main fuel line quick disconnect?



UPPER ENGINE ACCESS PANEL

YES

NO

(27)

- **Check for free fuel flow from main fuel supply line between quick disconnect and flexible line.**
- **See Step (70) .**

TA250015

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

28 **Check for free fuel flow from primary fuel filter bleed valve.**

First Technician (Rear of Crew Compartment)

- Connect main fuel line quick disconnect.
- Loosen bleed valve on primary fuel filter.

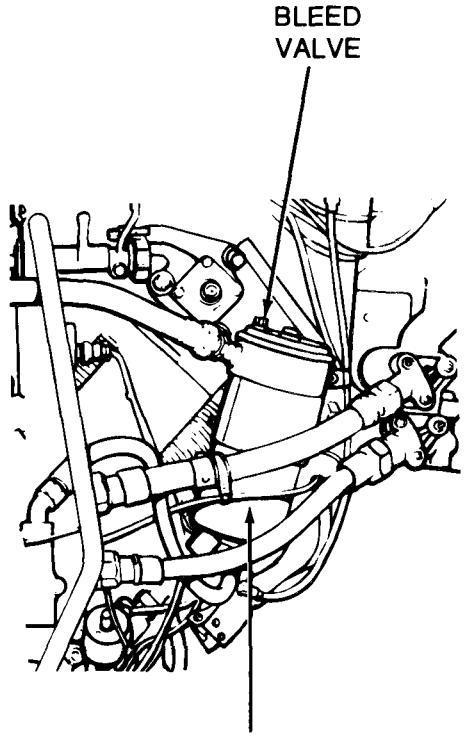
Second Technician (Operator's Station)

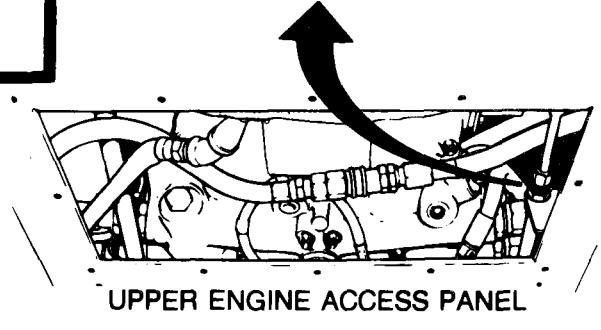
- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON for approximately 10 seconds then set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.

First Technician (Rear of Crew Compartment)

- Check for free fuel flow from primary fuel filter bleed valve.

Did fuel flow freely from primary fuel filter bleed valve?





YES

NO

29

- **Check for free fuel flow to primary fuel filter.**
- **See Step (77) .**

TA250016

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

30 **Check for free fuel flow to the inlet side of the backflow valve.**

First Technician (Rear of Crew Compartment)

- Tighten primary fuel filter bleed valve.
- Remove lower engine access panel (page 17-13).
- Disconnect main fuel line from backflow valve inlet (page 7-25).
- Place a container or rags under main fuel line to catch any fuel.

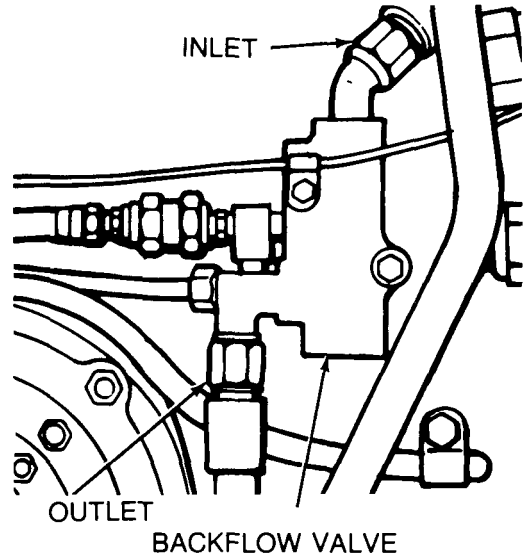
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON for approximately 10 seconds then set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.

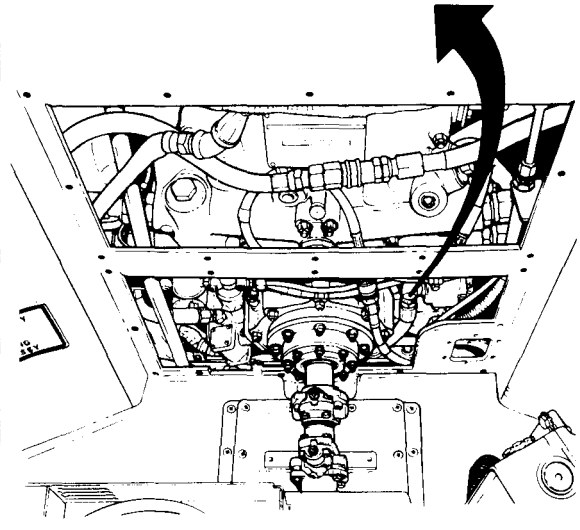
First Technician (Rear of Crew Compartment)

- Check for free fuel flow from main fuel line.

Did fuel flow freely from main fuel line to the backflow valve?



BACKFLOW VALVE



YES

NO

31
- **Clear line between primary fuel filter and backflow valve by blowing with compressed air.**
- **Connect main fuel line to backflow valve inlet (page 7-27).**
- **If this does not work, replace fuel line (page 7-40).**

TA250017

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

32 Check for free fuel flow at outlet side of backflow valve.

First Technician (Rear of Crew Compartment)

- Connect main fuel line from primary fuel filter to backflow valve.
- Disconnect main fuel line at outlet side of backflow valve.
- Place a container or rags under the open fuel line to catch any fuel.

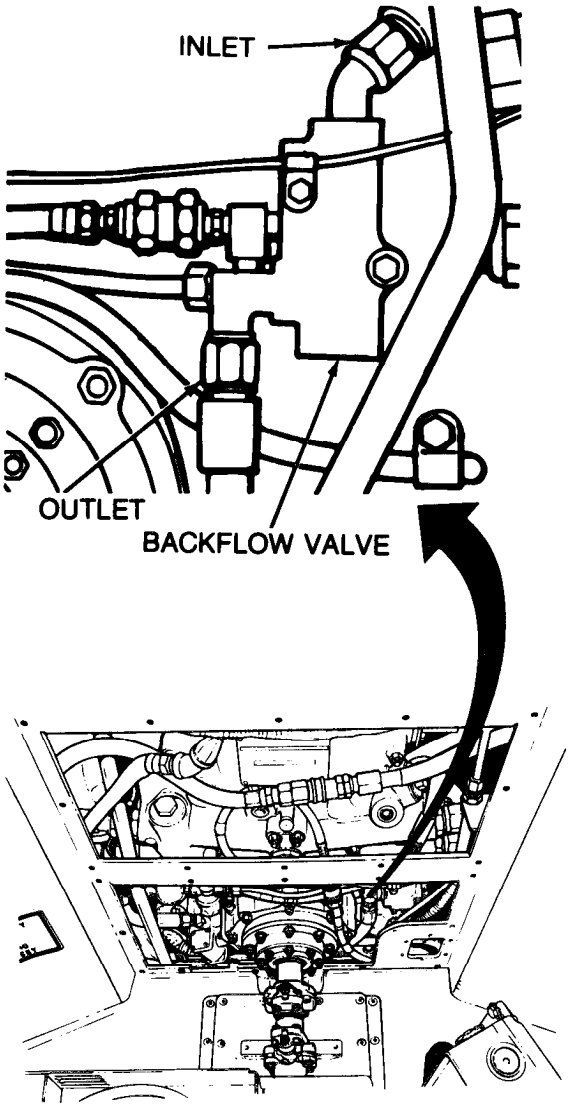
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON for approximately 10 seconds then set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.

First Technician (Rear of Crew Compartment)

- Check for free fuel flow from backflow valve.

Did fuel flow freely from outlet side of the backflow valve?



YES

NO

33 Replace backflow valve (page 7-25).

TA250018

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

34 **Check main fuel line between backflow valve and engine fuel pump for leaks.**

First Technician (Rear of Crew Compartment)

- Connect main fuel line to outlet side of backflow valve.

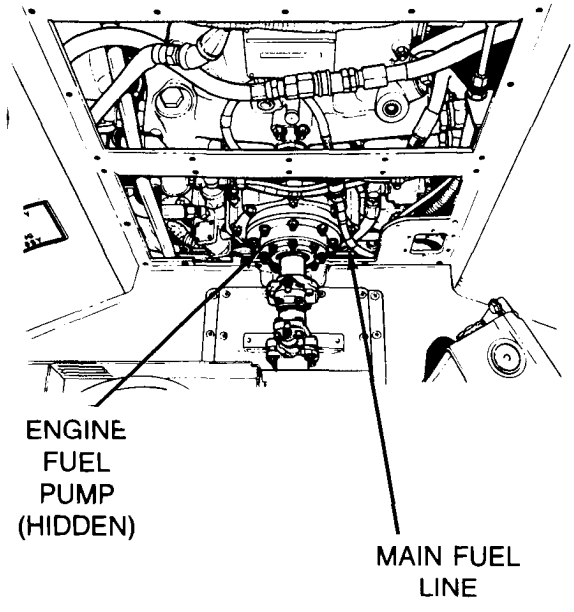
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.

First Technician (Rear of Crew Compartment)

- Check for leaks in main fuel line to engine fuel pump.

Is main fuel line to engine fuel pump leaking?



NO

YES

35 **Replace line between backflow valve and engine fuel pump (page 7-40).**

TA250019

Symptom-2

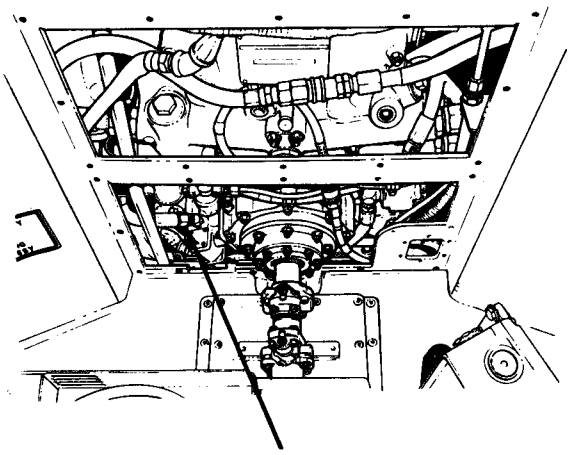
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

36 **Check for fuel leaks in fuel line from engine fuel pump to fuel-water separator.**

First Technician (Rear of Crew Compartment)

Check flexible hose line from engine fuel pump to fuel-water separator for leaks at fittings and hose.

Is fuel line between fuel water separator and engine fuel pump leaking?



FUEL LINE
TO FUEL-WATER
SEPARATOR

NO

YES

37

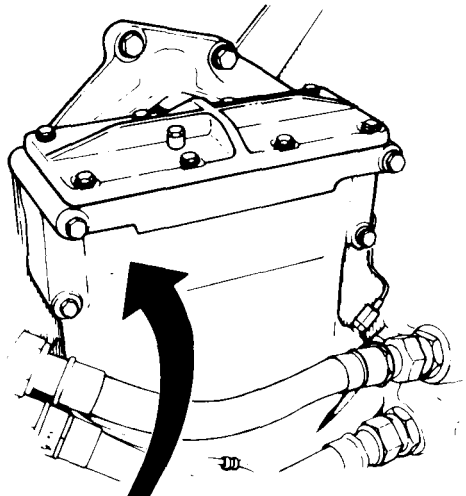
- **Tighten fitting.**
- **If this does not stop leaks replace fuel line (page 7-20).**

TA250020

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FUEL-WATER SEPARATOR

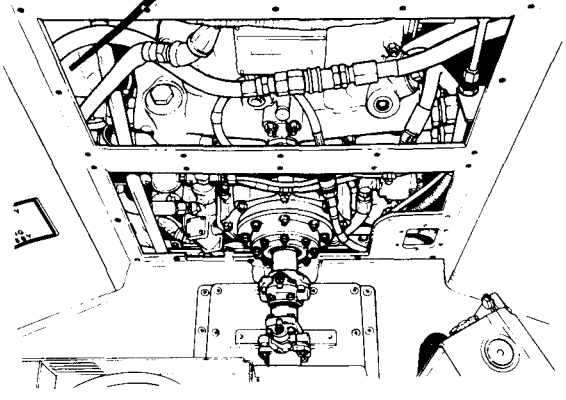


38 **Check for fuel leaks at fuel water separator.**

First Technician (Rear of Crew Compartment)

- Check fuel water separator cover for cracks, and fuel leaks at line connections.

Does fuel-water separator leak?



NO

YES

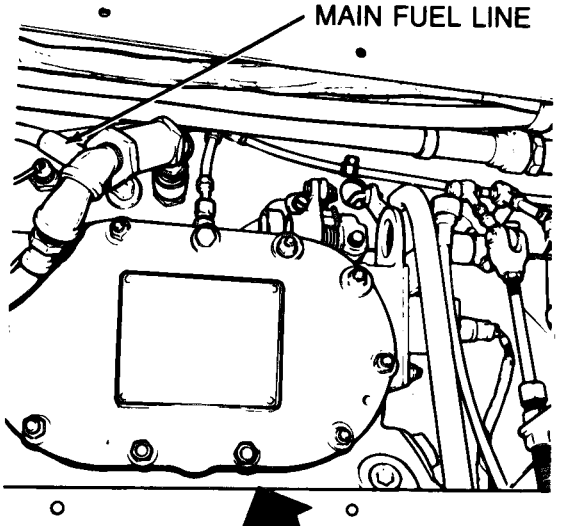
39

- **Tighten leaking fittings.**
- **If the fuel water separator is cracked, replace (page 7-187).**

TA250021

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

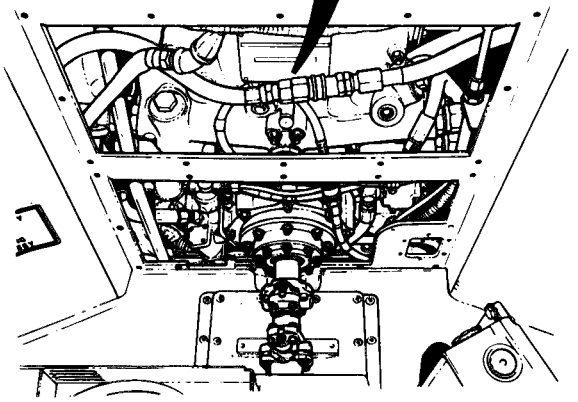


40 **Check fuel line between fuel-water separator and engine shroud for leaks.**

First Technician (Rear of Crew Compartment)

- Check flexible hose line between fuel water separator and front shroud on engine for leaks at connections and in the line.

Is fuel line leaking?



NO

YES

41

- **Tighten leaking fittings.**
- **If line is leaking, replace (page 7-223).**

TA250022

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

42 **Check main fuel line from front of engine to fuel injector pump for leaks.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set FUEL PUMPS switch OFF.

First Technician (Rear of Vehicle)

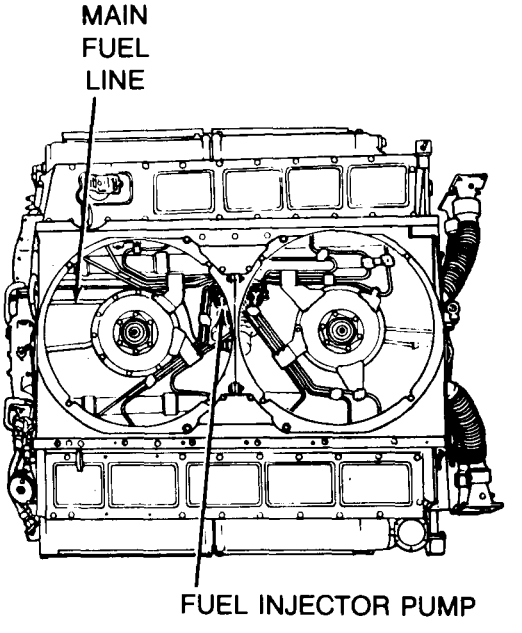
- Remove engine cooling fans (page 9-55).

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.

First Technician (Top of Engine)

- Check for leaks in main fuel line from front of engine to fuel injection pump.



Is main fuel line leaking?

NO

YES

43 **Replace main fuel line from front of engine to fuel injection pump (page 7-29).**

TA250023

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

44 **Check main fuel return line from fuel injector pump to back of engine for leaks.**

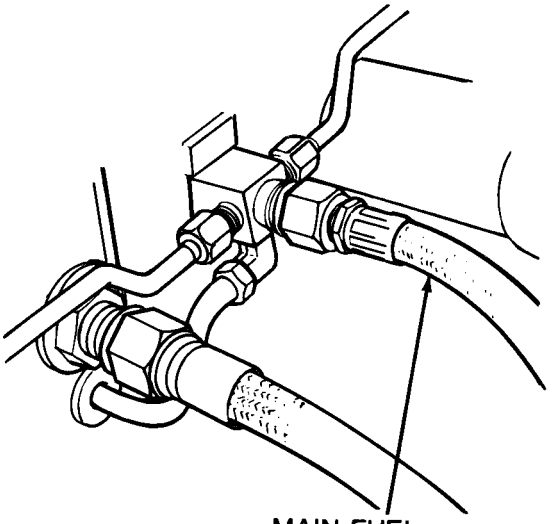
First Technician (Top Deck)

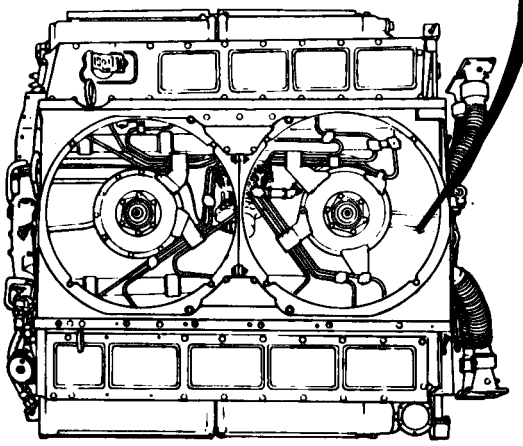
- Inspect main fuel return line between fuel injector pump and rear shroud for leaks.

Second Technician (Operator's Station)

- After leak check is complete, set MASTER BATTERY switch OFF.

Is main fuel return line leaking?





VIEW FROM LEFT SIDE OF VEHICLE

YES

45 **Replace main fuel return line between fuel injector pump and rear shroud on engine (page 7-29).**

- **Install engine cooling fans (page 9-57).**

NO

46

- **Replace main fuel return line from engine shroud to hose of quick disconnect (page 7-52).**
- **Install engine cooling fans (page 9-57).**

TA250024

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

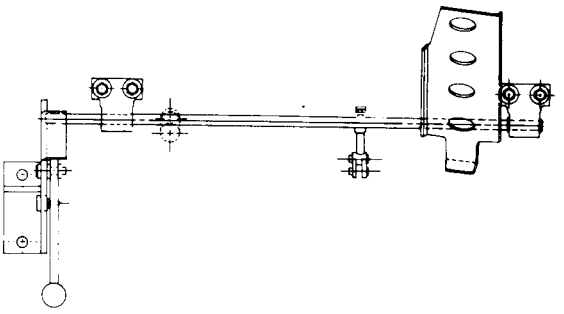
FROM STEP (8)

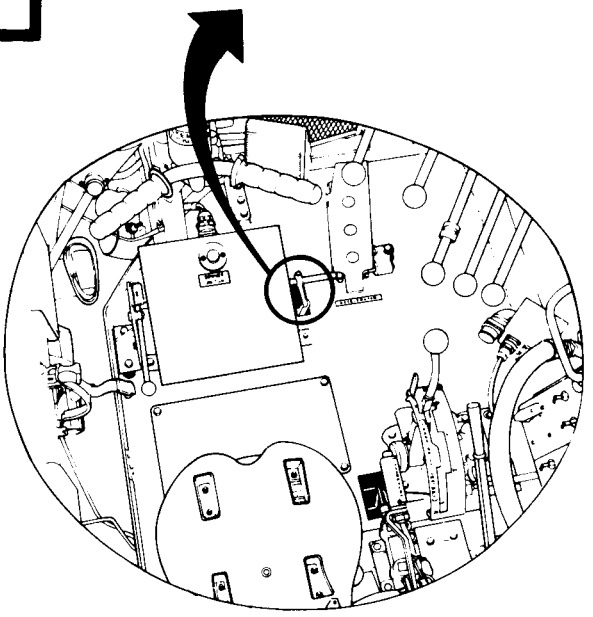
(47) **Check for binding at accelerator pedal.**

Second Technician (Operator's Station)

- Disconnect connecting link from link on accelerator shaft.
- Move accelerator up and down by hand.

Does accelerator pedal move freely without binding?





NO

YES

(48)
- **Check for binding in linkage between accelerator shaft and bulkhead flange assembly.**

- **See Step (52) .**

TA250025

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

49 **Check alignment at accelerator shaft and housing assemblies.**

Second Technician (Operator's Station)

- Visually check for proper alignment of accelerator shaft and housing assemblies.

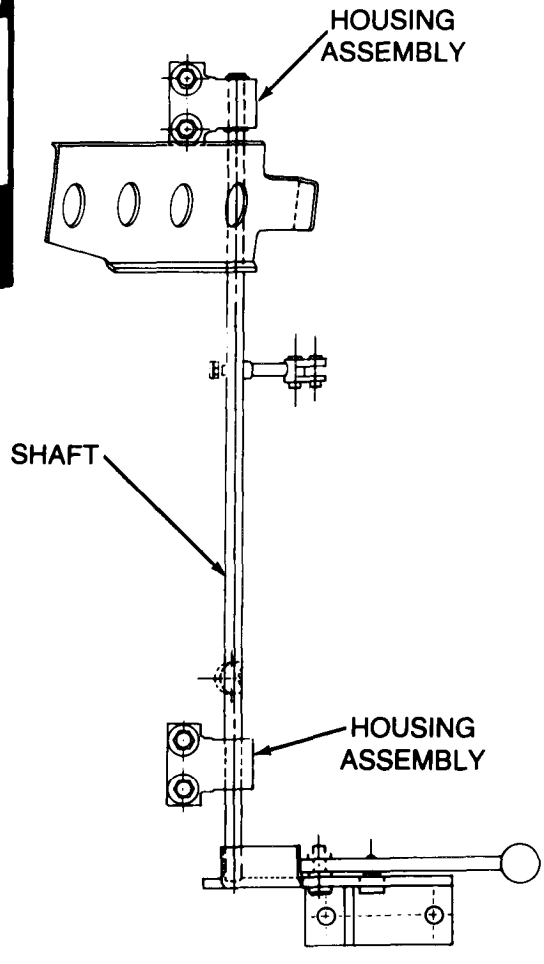
Are housing assemblies and accelerator shaft properly aligned?

NO

50
- **Aline housing assemblies and accelerator shaft.**
- **Connect connecting link to link on accelerator shaft.**

YES

51
- **Replace binding housing assembly or damaged accelerator shaft.**
- **Connect connecting link to link on accelerator shaft.**



TA250026

Symptom-2 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

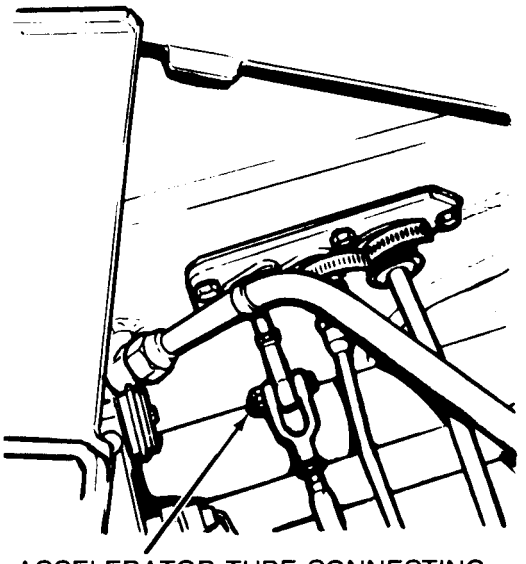
FROM STEP 48

52 **Check for binding in linkage between accelerator shaft and bulkhead flange assembly.**

Second Technician (Operator's Station)

- Connect connecting link to link on accelerator shaft.
- Remove left-hand floor access cover (page **17-8**).
- Remove pin connecting accelerator tubes at bulkhead.
- Press accelerator pedal down and release.

Does accelerator pedal move freely without binding?



ACCELERATOR TUBE CONNECTING PIN

YES

NO

53 **Replace bellcrank assembly (page 7-328).**

TA250027

Symptom-2

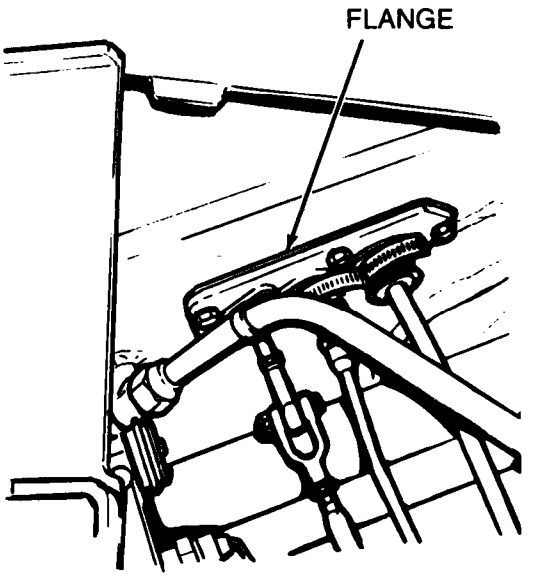
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

54 **Check for binding in flange at engine compartment bulkhead.**

Second Technician (Operator's Station)

- Install pin connecting accelerator tubes at bulkhead.
- Lock accelerator pedal in full down position.
- Remove nuts holding flange to bulkhead (page **7-324**).
- Slide flange forward on accelerator tube.

Does flange move freely on the tube after it is out of the bulkhead?



YES

NO

55 **Repair flange (page 7-324).**

TA250028

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

56 **Check for binding in accelerator linkage between bulkhead and engine.**

Second Technician (Operator's Station)

- Reinstall flange (page 7-326).

First Technician (Rear of Crew Compartment)

- Remove engine upper access panel (page 17-11).
- Disconnect link rod by removing bolt from clevis.

Second Technician (Operator's Station)

- Press and release accelerator pedal.

Does accelerator pedal move freely without binding?

NO

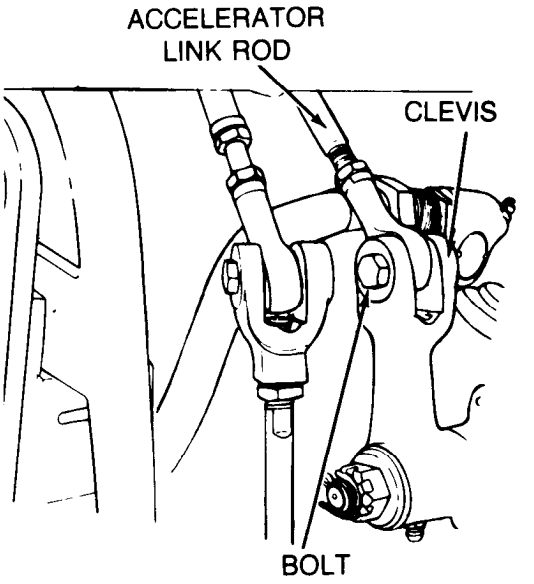
57

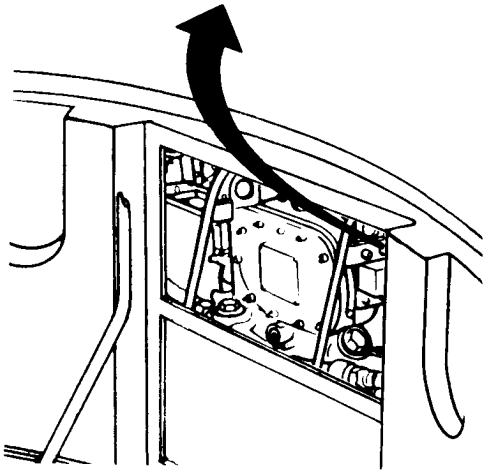
- **Notify support maintenance of accelerator linkage problem between bulkhead floor and engine.**
- **Connect accelerator link rod to clevis.**
- **Install engine upper access panel (page 17-12).**

YES

58

- **Notify support maintenance of accelerator linkage problem on engine.**
- **Connect accelerator link rod to clevis.**
- **Install engine upper access panel (page 17-12).**





TA250029

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FROM STEP 10

59 **Check for movement of throttle stop pin at engine.**

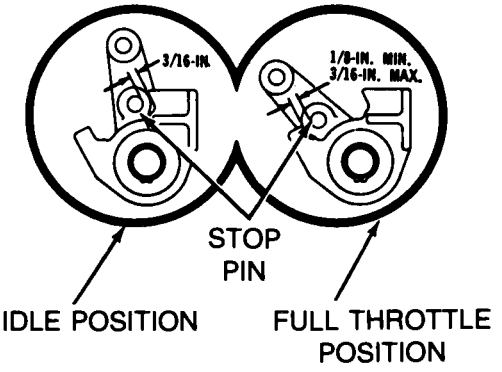
Second Technician (Operator's Station)

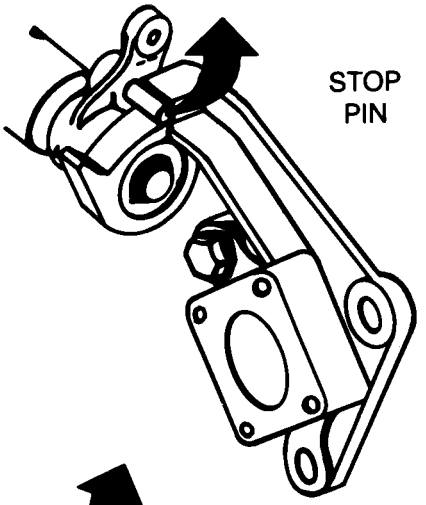
- Press accelerator pedal all the way down and release.

First Technician (Rear of Crew Compartment)

- Check position of stop pin at idle and at full throttle.

Does stop pin move to specified positions?



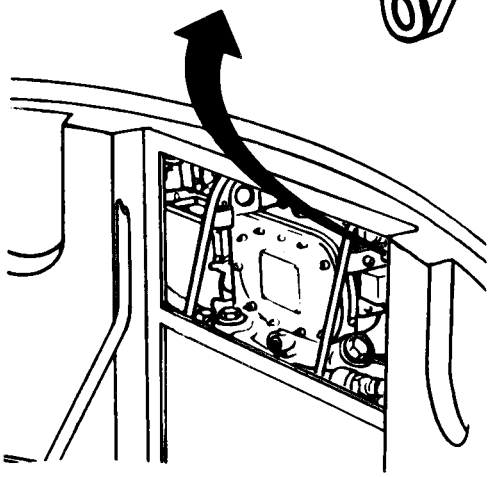


60 **Adjust accelerator linkage to get correct throttle stop pin specifications (page 7-316).**

NO

61 **Notify support maintenance of problem with throttle crossover shaft.**

YES



TA250030

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FROM STEP (12)

(62) Check front accessory harness (CKT 54A) at bulkhead disconnect for electrical power (MASTER BATTERY switch OFF).

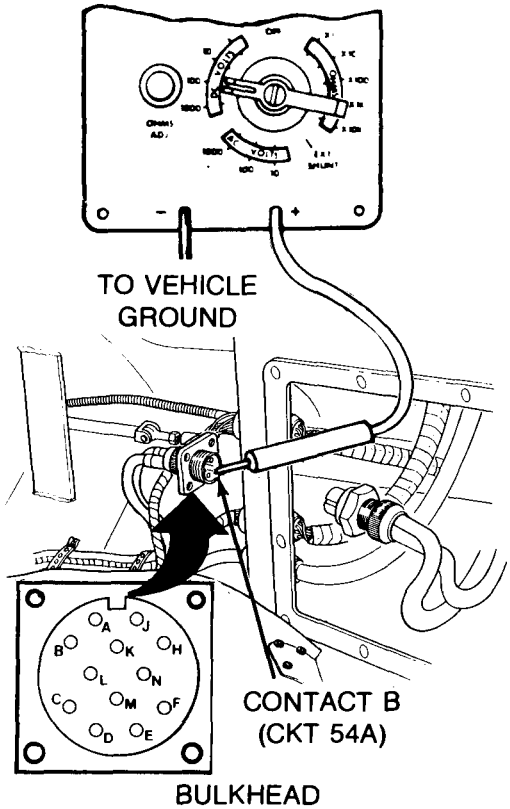
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Displace front accessory harness from bulkhead disconnect (page 10-269).
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact B (CKT 54A) of front accessory harness connector at bulkhead disconnect and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



YES

NO

(63)

- **Check front accessory harness (CKT 54A) at bulkhead disconnect for electrical power (MASTER BATTERY switch ON).**

- **See Step (67) .**

TA250031

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE VEHICLE OPERATION - POWERPLANT, STARTING (Continued)

64 **Check fire extinguisher fuel shutoff switch for continuity (internal short).**

First Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).
- Install engine upper access panel (page 17-12).

Second Technician (Operator's Station)

- Disconnect front accessory harness connectors (CKT 975) from fire extinguisher fuel shutoff switch.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect one probe of meter to each disconnected fuel shutoff switch connector.
- Check if meter indicates continuity.

Did meter indicate continuity, thereby indicating a shorted switch?

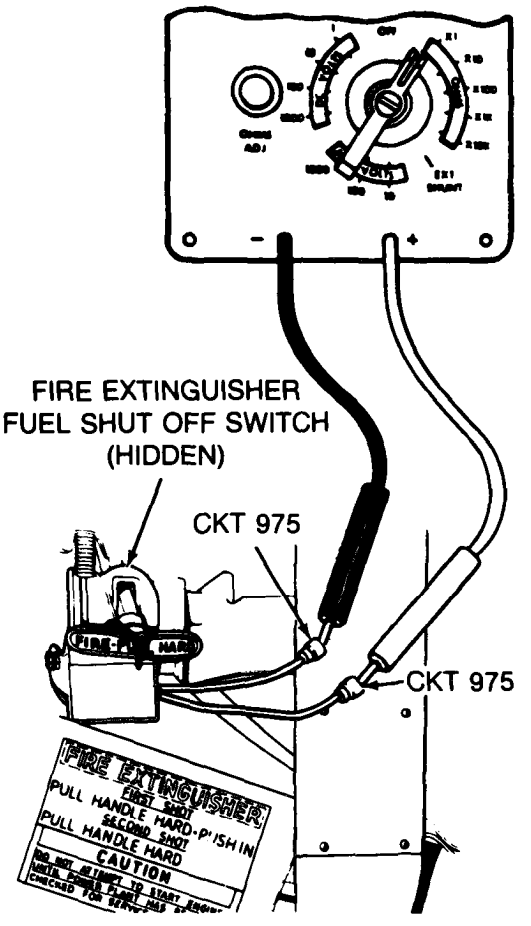
65

- **Replace fire extinguisher and fuel shutoff relay (page 10-141).**
- **Connect front accessory harness connectors to fire extinguisher fuel shutoff switch.**

NO

66 **Replace fuel shutoff switch (page 20-28).**

YES



TA250032

Symptom-2 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FROM STEP 63

67 **Check front accessory harness (CKT 54A) at bulkhead disconnect for electrical power (MASTER BATTERY switch ON).**

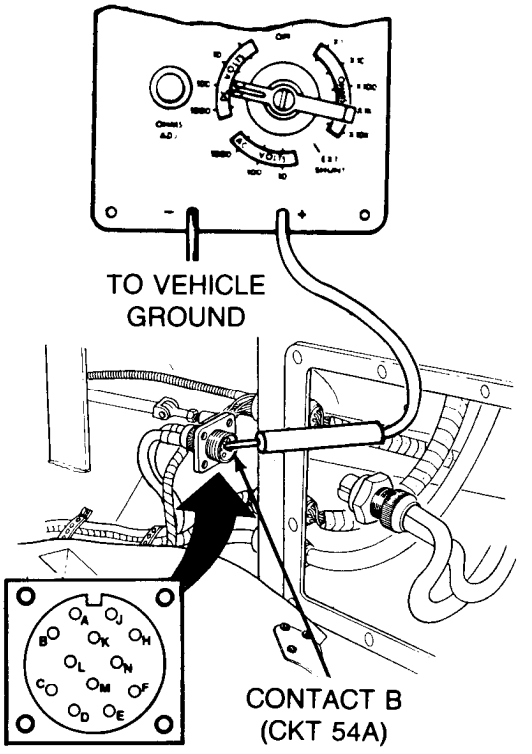
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Connect red probe of meter to contact B (CKT 54A) of front accessory harness connector at bulkhead disconnect and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



NO

68
- **Notify support maintenance of inoperative fuel shutoff solenoid.**
- **Install engine access panel (page 17-12).**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**

YES

69
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**
- **Replace fuel shutoff switch (page 20-28).**
- **Install engine access panel (page 17-12).**

TA250033

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FROM STEP (27)

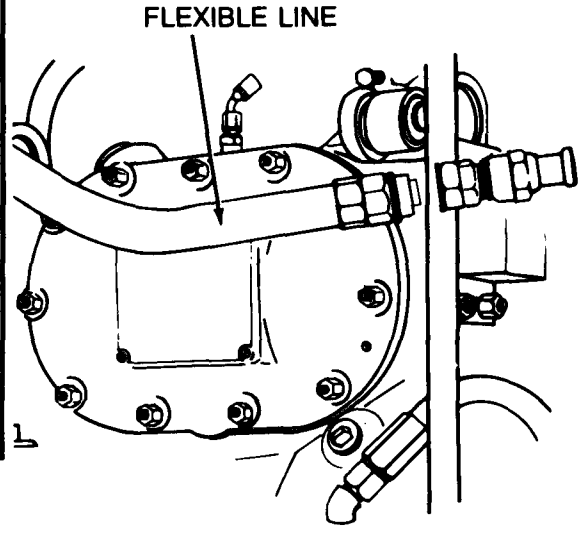
(70) Check for free fuel flow from main fuel supply line between quick disconnect and flexible line.

First Technician (Rear of Crew Compartment)

- Remove female quick disconnect half from flexible line.
- Place a suitable container under open line to catch any fuel.

Second Technician (Operator's Station)

- Set FUEL PUMPS switch ON for approximately 10 seconds, then set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.



Does fuel flow freely from flexible line?

NO

YES

(71) Replace quick disconnect.

TA250034

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

72 **Check for free fuel flow from main fuel line at connection between tubing and flexible hose.**

First Technician (Top Deck)

- Have powerplant removed (page 5-2).

First Technician (Engine Compartment)

- Disconnect flexible hose from metal fuel supply line.
- Place a suitable container or rags under fuel line to catch any fuel.

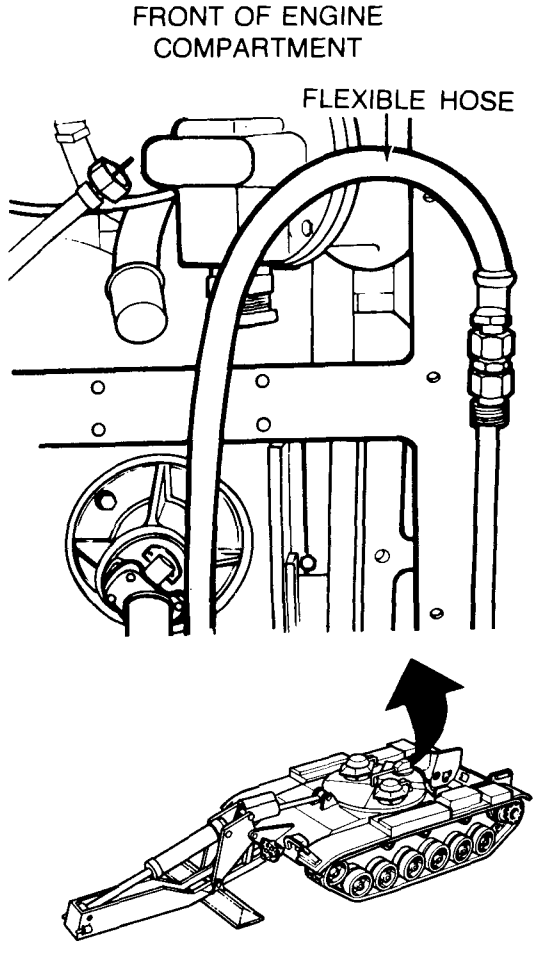
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON for approximately 10 seconds, then set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.

Did fuel flow freely from metal fuel supply line?

NO

YES



73

- **Clear clogged flexible hose by blowing with compressed air.**
- **Install female quick disconnect half to flexible hose.**
- **Connect flexible hose to metal fuel supply line.**
- **If this does not work, replace flexible hose.**

TA250035

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

74 **Check for free fuel flow from tee on main fuel supply line in engine compartment.**

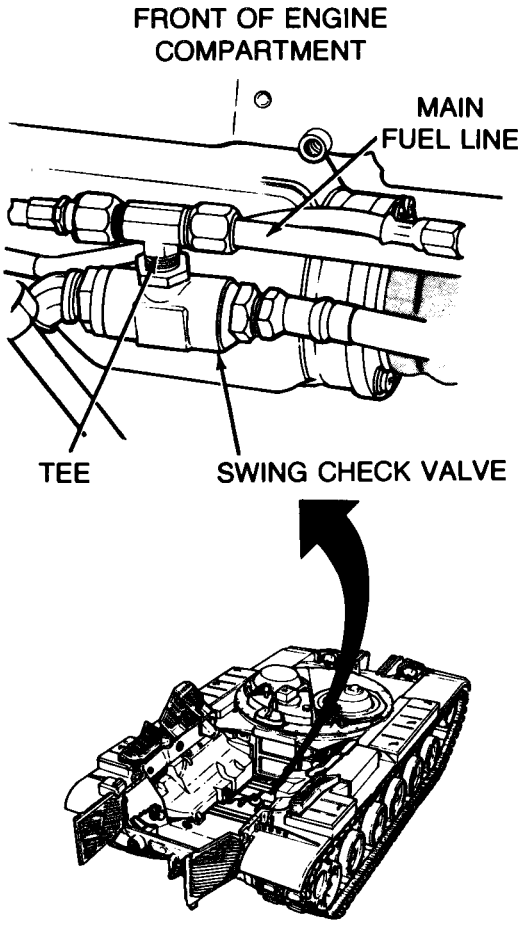
First Technician (Engine Compartment)

- Reconnect flexible hose to metal fuel supply line.
- Install female quick disconnect half to flexible line.
- Disconnect main fuel line at tee in main fuel line.
- Place a container or rags under open fitting to catch any fuel.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON for a few seconds, then set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.

Did fuel flow freely from tee of main fuel supply line?



NO

75 **Replace swing check valve (page 7-294).**

YES

76
- **Clear clogged metal fuel supply line by blowing with compressed air.**
- **Connect main fuel line.**
- **If this does not work, replace metal fuel supply line.**

TA250036

Symptom-2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FROM STEP 29

77 **Check for free fuel flow to primary fuel filter.**

First Technician (Rear of Crew Compartment)

- Remove primary fuel filter element (page 7-187).

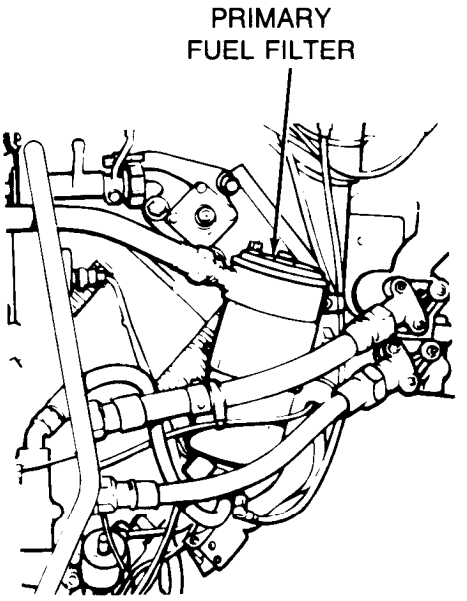
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON for approximately 10 seconds, then set FUEL PUMPS switch OFF.

First Technician (Rear of Crew Compartment)

- Check for fuel flowing into primary fuel filter.

Did fuel flow into primary fuel filter with element removed?



NO

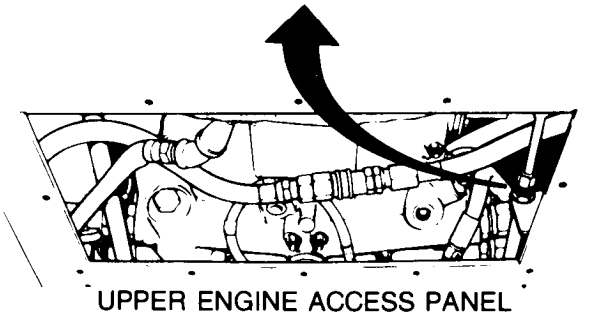
78

- **Clear flexible line to primary fuel filter by blowing with compressed air.**
- **If this does not work, replace flexible line (page 7-193).**
- **Tighten primary fuel filter bleed valve.**

YES

79

- **Replace primary fuel filter element (page 7-187).**
- **Tighten primary fuel filter bleed valve.**



TA250037

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING

Symptom-3

ENGINE CRANKS SLOWLY AND WILL NOT START.

NOTE

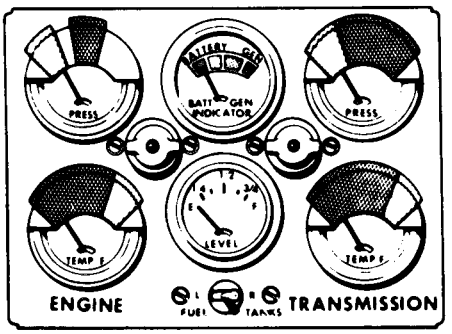
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 **Check BATT GEN INDICATOR gage for above mid yellow indication.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Visually check if BATT GEN INDICATOR gage indicates above mid yellow.
- Set MASTER BATTERY switch OFF.

Does BATT GEN INDICATOR gage indicate above mid yellow?



YES

NO

2

- **Service batteries (TM 5-5420-226-10).**
- **Charge batteries (TM 9-6140-200-14).**
- **If STE/ICE is available, perform Test No. 77/79: BATTERY CONDITION TEST (page 4-60).**

TA250038

Symptom-3

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

NOTE

If outside air temperature is above 40°, go to Step (5).

WARNING

Do not touch manifold preheaters with bare hands.

3 Check manifold preheaters for heat.

First Technician (Top Deck)

- Open left and right top deck grille doors.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.
- At the same time, press STARTER BUTTON, PREHEAT SWITCH and operate primer pump. Do not hold switches on for more than 14 seconds.

First Technician (Top Deck)

- Reach through grille door opening and feel for heat from manifold preheater (left and right side).
- Check if heat comes from both manifold preheaters.

Second Technician (Operator's Station)

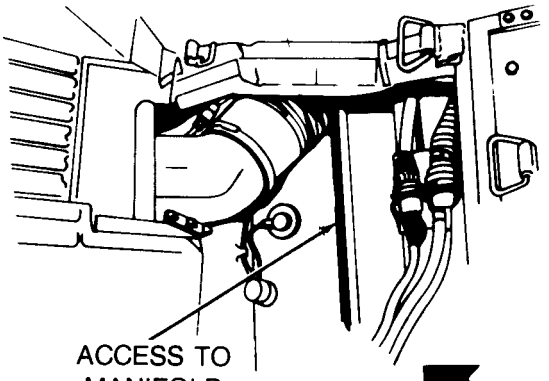
- Set MASTER BATTERY switch OFF.

Does heat come from both manifold preheaters?

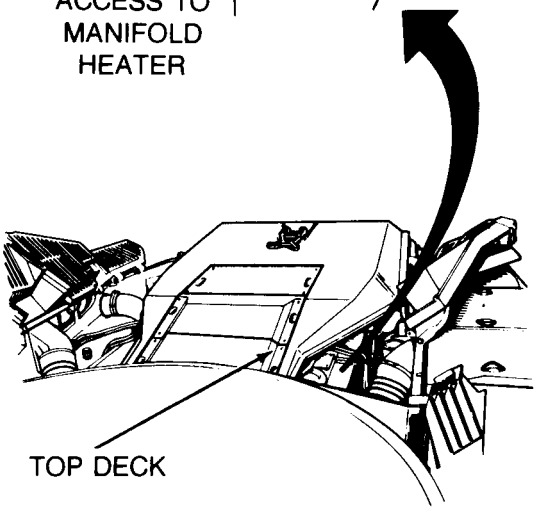
YES

NO

VIEW THROUGH LEFT GRILLE DOORS



ACCESS TO MANIFOLD HEATER



TOP DECK

4

- **If both preheaters are cold, See Symptom 9: BOTH INTAKE MANIFOLD PREHEATERS WILL NOT WORK.**
- **If only one preheater is cold, See Symptom 8: ONE INTAKE MANIFOLD PREHEATER WILL NOT WORK.**

TA250039

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

Symptom-3

NOTE

If STE/ICE is available, perform Test No. 74, STARTER CIRCUIT RESISTANCE (page 4-73) before doing Step (5).

5 **Check battery slave cable connector (CKT 81) at bulkhead disconnect for loose corroded or damaged wires and/or connector contacts.**

Second Technician (Front of Crew Compartment)

- Disconnect three battery ground straps (page 10-268).

WARNING

After disconnecting ground straps, do not allow them to contact any metal surface.

First Technician (Commander's Station)

- Displace battery slave cable connector (CKT 81) from bulkhead disconnect (page 10-269).
- Check battery slave cable connector (CKT 81) for loose, corroded or damaged wires and/or contacts.

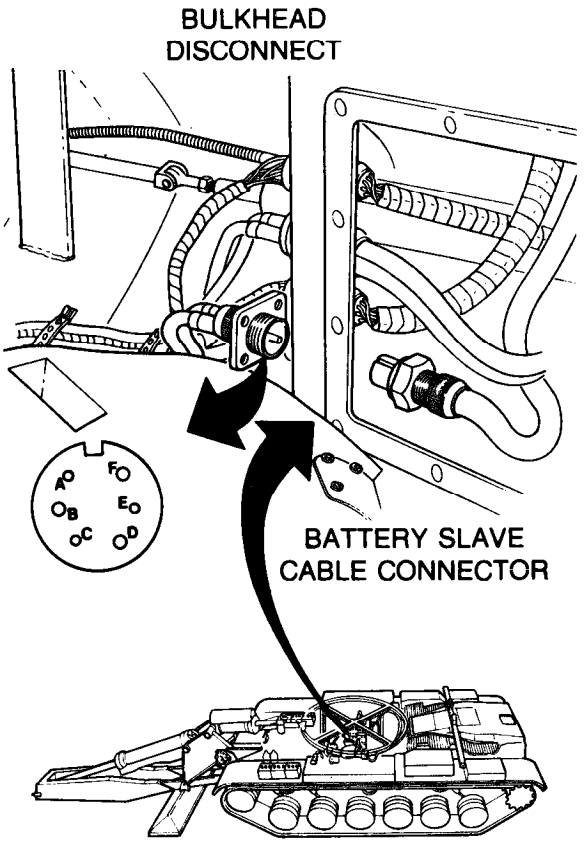
Does connector have loose, corroded or damaged wires and/or contacts?

NO

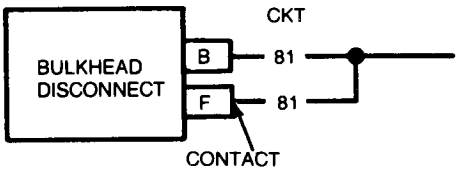
YES

6

- **Repair battery slave cable (page 10-298).**



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



TA250040

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

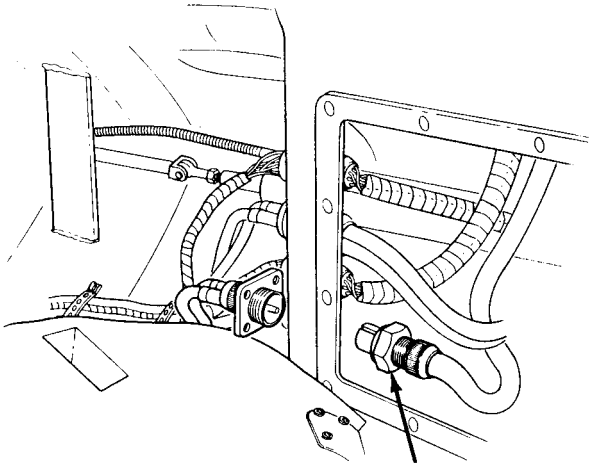
Symptom-3

7 **Check starter feed harness connector (CKT 81) at bulkhead disconnect for loose, corroded or damaged wires and/or contacts.**

First Technician (Commander's Station)

- Check starter feed harness connector (CKT 81) at bulkhead disconnect for loose, corroded or damaged wires and/or contacts.

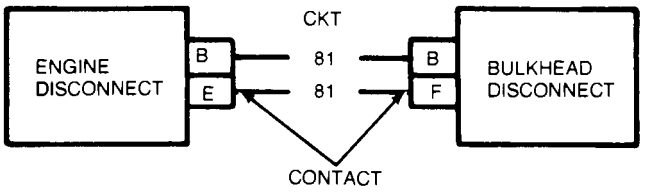
Does connector have loose, corroded or damaged wires and/or contacts?



NO

YES

8 **Repair starter feed harness (page 10-298).**



TA250041

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

Symptom-3

9 **Check starter feed harness connector (CKT 81) at engine disconnect for loose, corroded or damaged wires and/or contacts.**

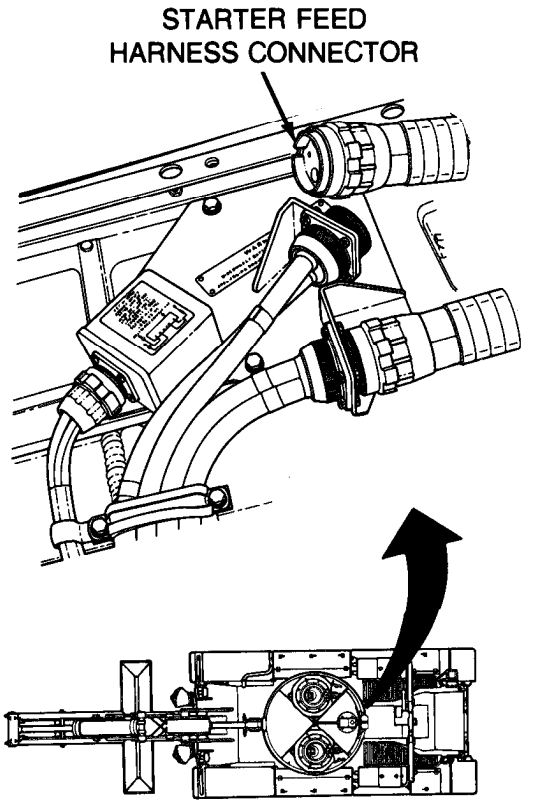
First Technician (Commander's Station)

- Install battery slave cable at bulkhead disconnect (page 10-270).

First Technician (Top Deck)

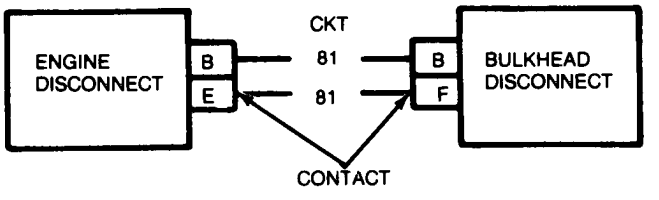
- Open right top deck grille doors.
- Disconnect starter feed harness connector (CKT 81) from engine disconnect.
- Check starter feed harness connector for loose, corroded or damaged wires and/or contacts.

Does connector have loose, corroded or damaged wires and/or contacts?



YES → **10** **Repair starter feed harness (page 10-298).**

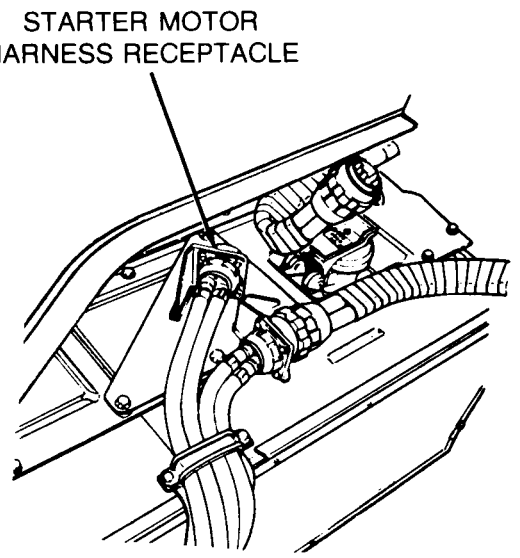
NO



TA250042

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

Symptom-3



11 **Check starter motor harness connector (CKT 81) at engine disconnect for loose, corroded or damaged wires and/or contacts.**

First Technician (Top Deck)

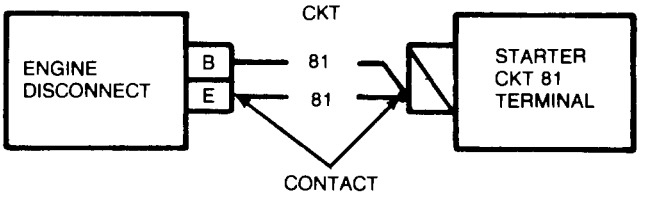
- Check starter motor harness connector (CKT 81) at engine disconnect for loose, corroded or damaged wires and/or contacts.

Does connector have loose, corroded or damaged wires and/or loose contacts?

NO

YES

12 **Repair starter motor harness (page 10-298).**



TA250043

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

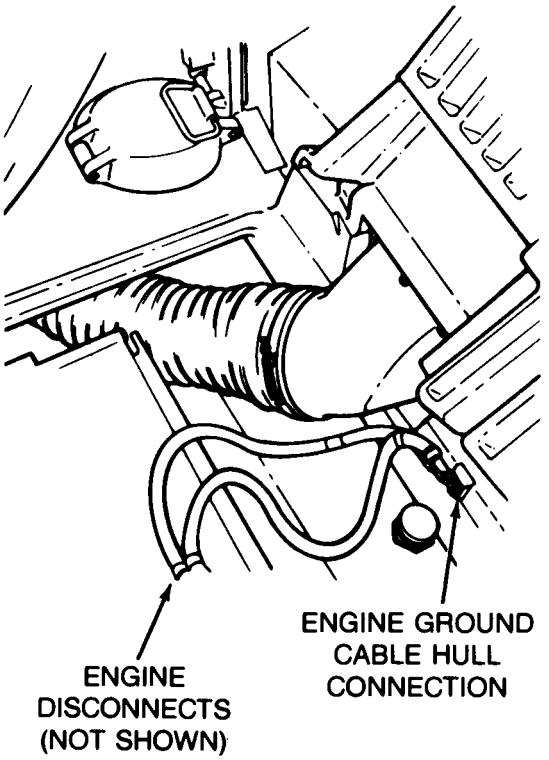
Symptom-3

13 **Check engine ground cable (CKT GND) for loose, corroded or damaged wires and/or terminals at hull connection.**

First Technician (Top Deck)

- Connect starter feed harness to engine disconnect.
- Check engine ground cable (CKT GND) for loose, corroded or damaged wires and/or terminals at hull connection.

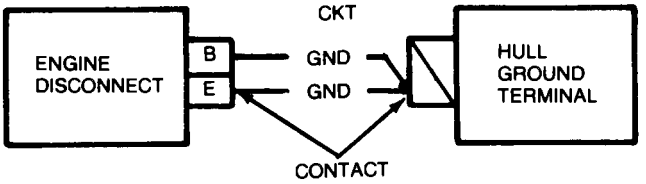
Does cable have loose, corroded or damaged wires and/or terminals at hull connection?



NO

YES

14 **Replace engine ground cable (page 10-271).**



TA250044

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

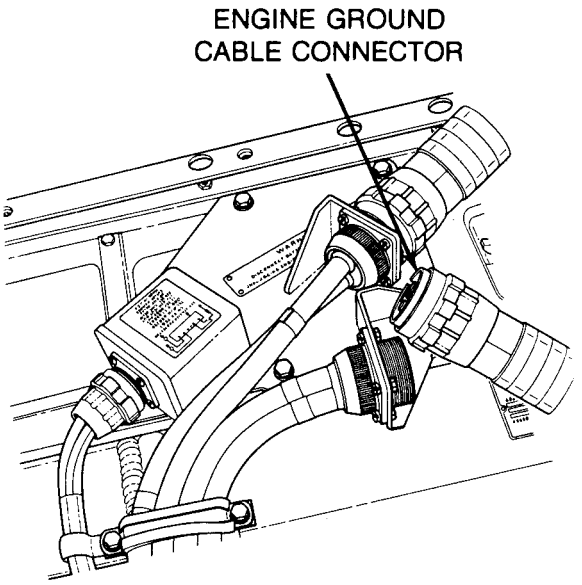
Symptom-3

15 **Check engine ground cable connector (CKT GND) at engine disconnect for loose, corroded or damaged wires and/or contacts.**

First Technician (Top Deck)

- Disconnect engine ground cable connector (CKT GND) from engine disconnect.
- Check engine ground cable connector (CKT GND) for loose, corroded or damaged wires and/or contacts.

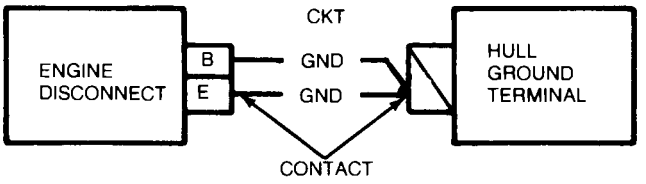
Does connector have loose, corroded or damaged wires and/or contacts?



NO

YES

16 **Replace engine ground cable (page 10-271).**



TA250045

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

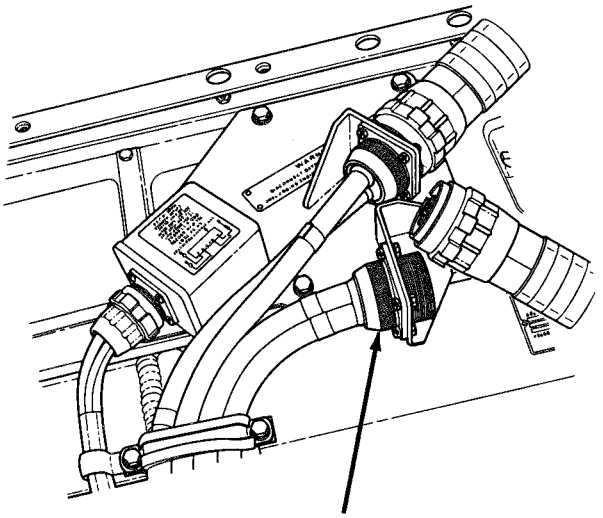
Symptom-3

17 **Check starter ground harness (CKT GND) connector at engine disconnect for loose, corroded or damaged wires and/or contacts.**

First Technician (Top Deck)

- Check starter ground harness (CKT GND) connector for loose, corroded or damaged wires and/or contacts.

Does connector have loose, corroded or damaged wires and/or contacts?

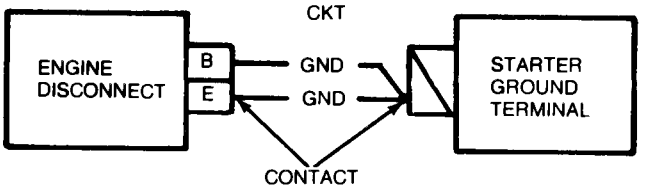


STARTER GROUND HARNESS CONNECTOR

NO

YES

18 **Repair starter ground harness (page 10-298).**



TA250046

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

Symptom-3

19 **Check starter motor harness (CKT 81) at starter solenoid terminals for loose, corroded or damaged wires and terminal connectors.**

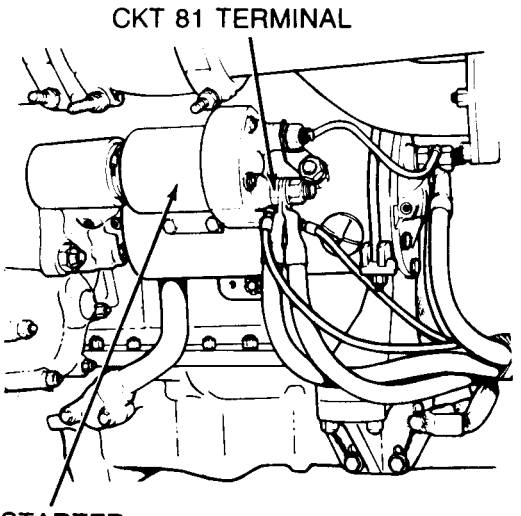
First Technician (Top Deck)

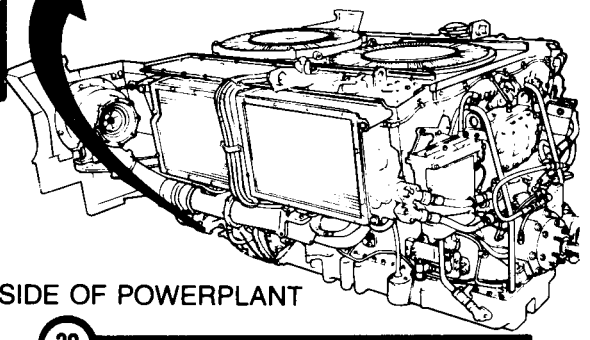
- Have powerplant removed (page 5-2).

First Technician (Left Side of Powerplant)

- Check starter motor harness (CKT 81) at starter solenoid terminal for loose, corroded or damaged wires and/or terminal connectors.

Does harness have loose, corroded or damaged wires and/or terminal connectors?

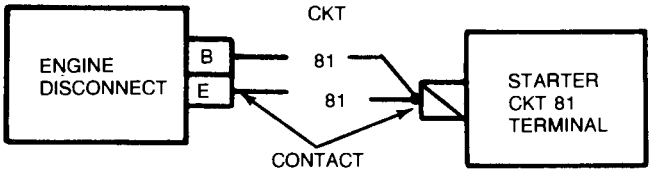




NO

YES

20 **Repair starter motor harness (page 10-298).**



TA250047

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

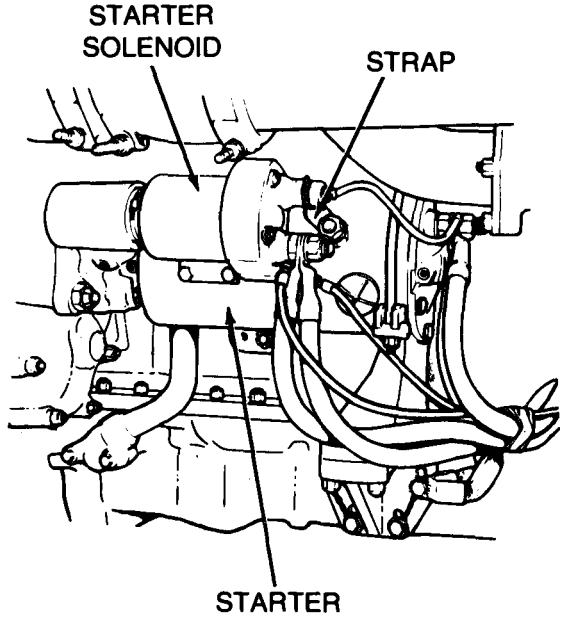
Symptom-3

21 **Check strap between starter solenoid and starter for loose connections and corrosion.**

First Technician (Left Side of Powerplant)

- Check strap between starter motor and solenoid for loose connections and corrosion.

Does strap have loose connections or corrosion?



NO

YES

22 **Clean and tighten strap.**

TA250048

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

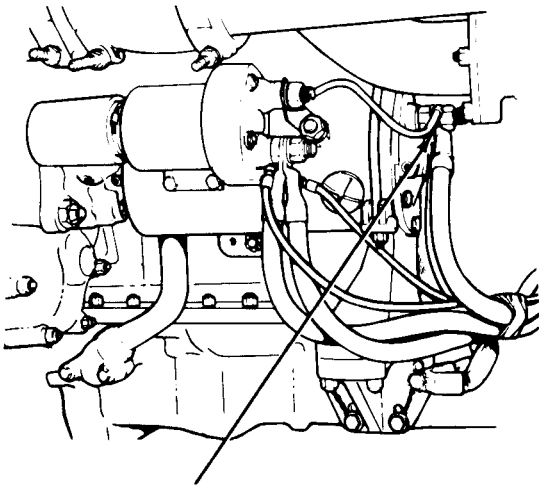
Symptom-3

23 **Check starter ground harness (CKT GND) at starter for loose, corroded or damaged wires and/or terminal connectors.**

First Technician (Left Side of Powerplant)

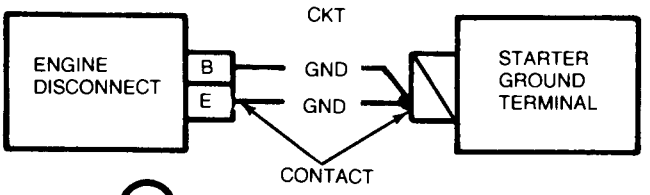
- Check starter ground harness (CKT GND) at starter for loose, corroded or damaged wires and/or terminal connectors.

Does harness have loose, corroded or damaged wires and/or terminal connectors?



YES

24 **Repair starter ground harness (page 10-298).**



NO

25 **Replace starter (page 10-21).**

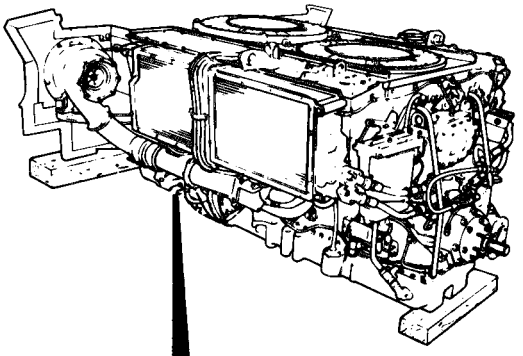
TA250049

Symptom-4

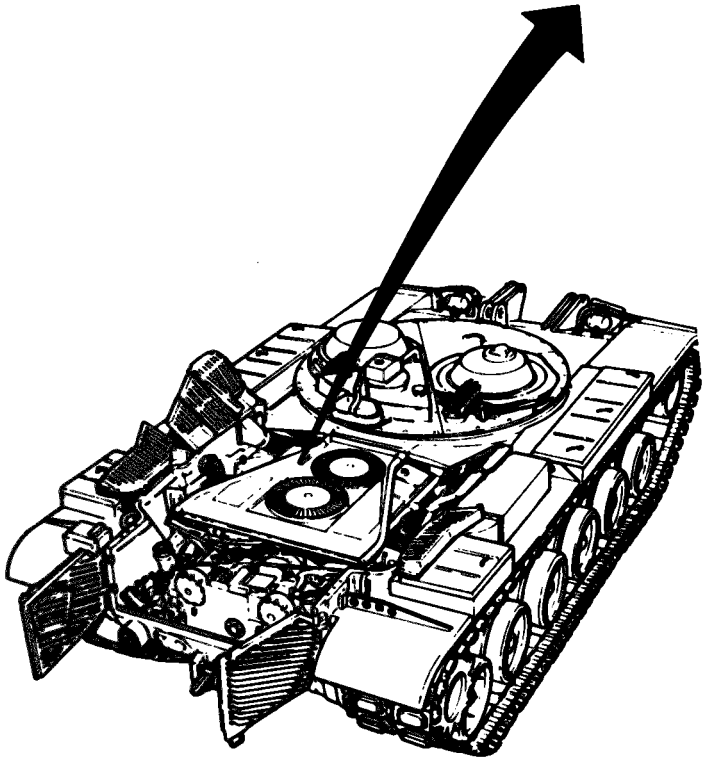
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING

ENGINE STARTER SPINS, BUT WILL NOT CRANK ENGINE.

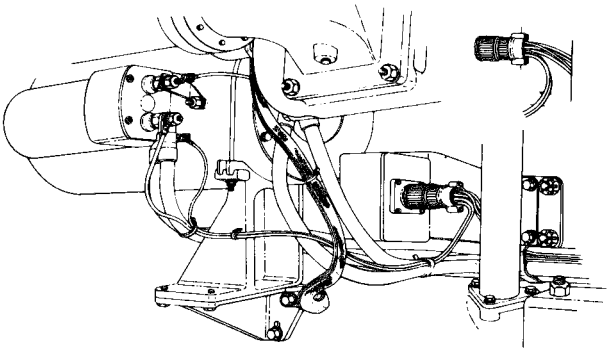
LOCATOR VIEWS:



POWERPLANT



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



STARTER ASSEMBLY

TA250050

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

Symptom-4

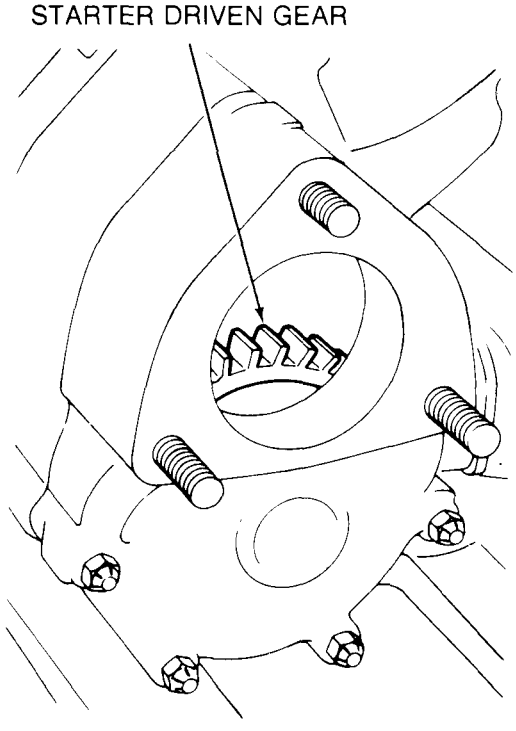
ENGINE STARTER SPINS, BUT WILL NOT CRANK ENGINE.

1 Check starter driven gear on the engine for damaged and broken teeth.

Technician (Rear of Vehicle)

- Have powerplant removed (page 5-2).
- Remove starter (page 10-21).
- Look through the opening in the starter adapter at the starter driven gear.

Does the starter driven gear have damaged or broken teeth?



YES

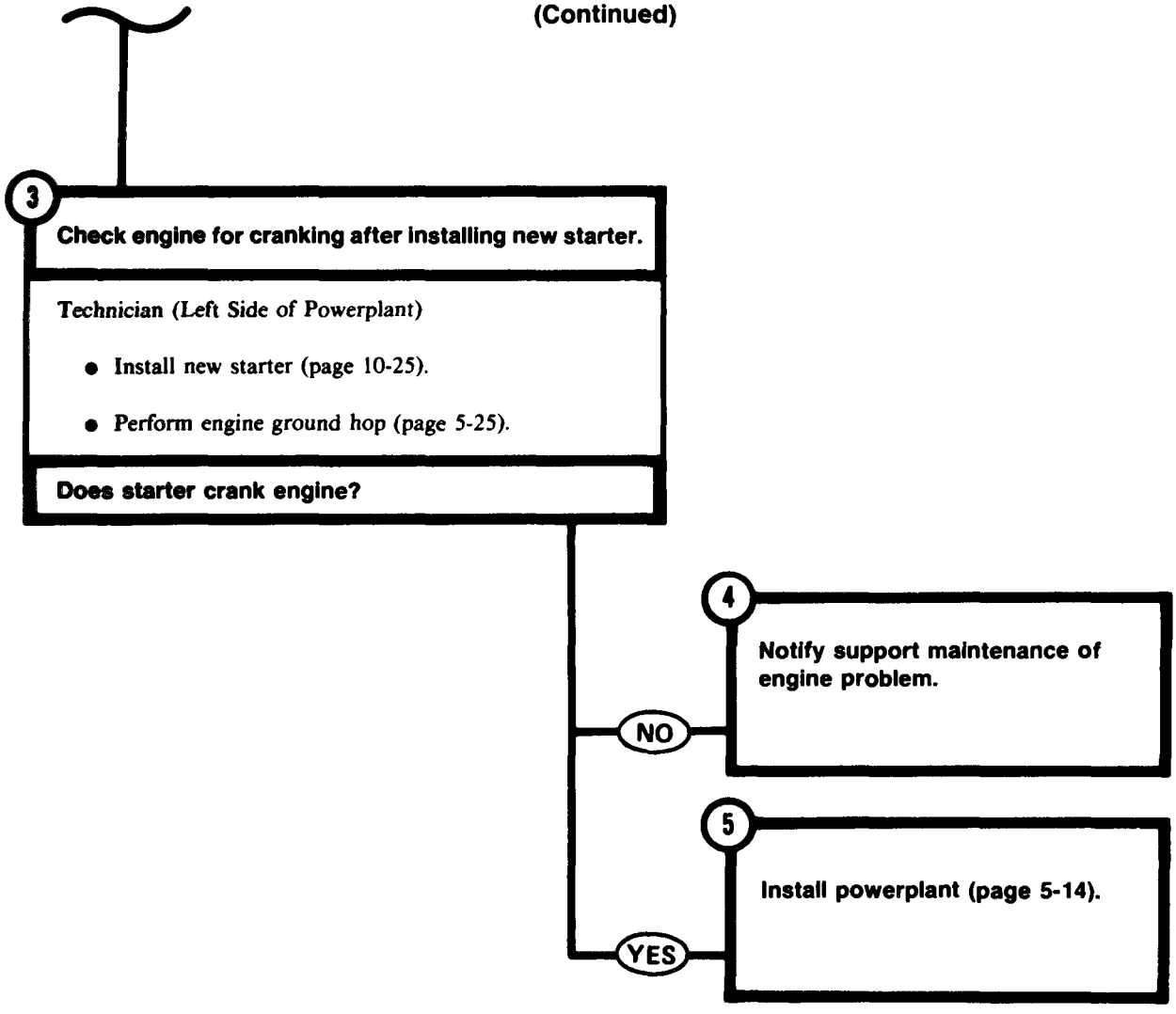
2 Notify support maintenance of damaged starter driven gear.

NO

TA250051

Symptom-4

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)



TA250052

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING

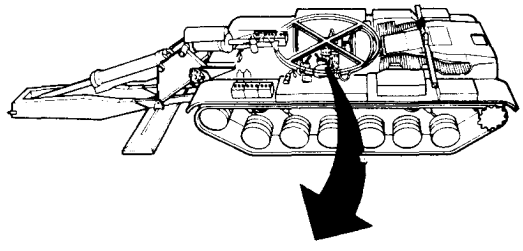
Symptom-5

ONE ELECTRICAL FUEL PUMP WILL NOT WORK.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



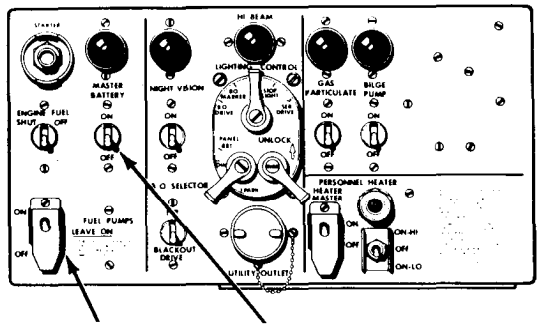
1 Check for fuel pump not running.

First Technician (Rear Grille Doors)

- Listen for sound of left fuel tank fuel pump running when switches are turned ON.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.
- Listen for sound of right fuel tank fuel pump running.
- Determine which fuel pump is not running; then set MASTER BATTERY switch OFF.



FUEL PUMPS SWITCH

MASTER BATTERY SWITCH

Which fuel pump was not running?

RIGHT

LEFT

2

- **Check front accessory harness (CKT 76) at bulkhead disconnect for electrical power to left fuel tank fuel pump.**
- **See Step (18)**

TA250053

Symptom-5

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

3 **Check front accessory harness (CKT 76) at bulkhead disconnect for electrical power to right fuel tank fuel pump.**

First Technician (Commander's Station)

- Displace front accessory harness connector (CKT 76) to engine disconnect harness at bulkhead disconnect (page 10-269).
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact K (CKT 76) of front accessory harness connector at bulkhead disconnect and black probe to ground.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

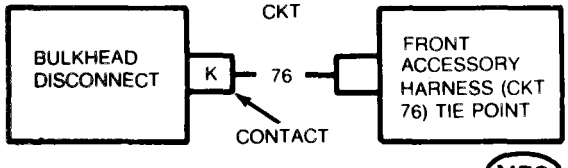
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

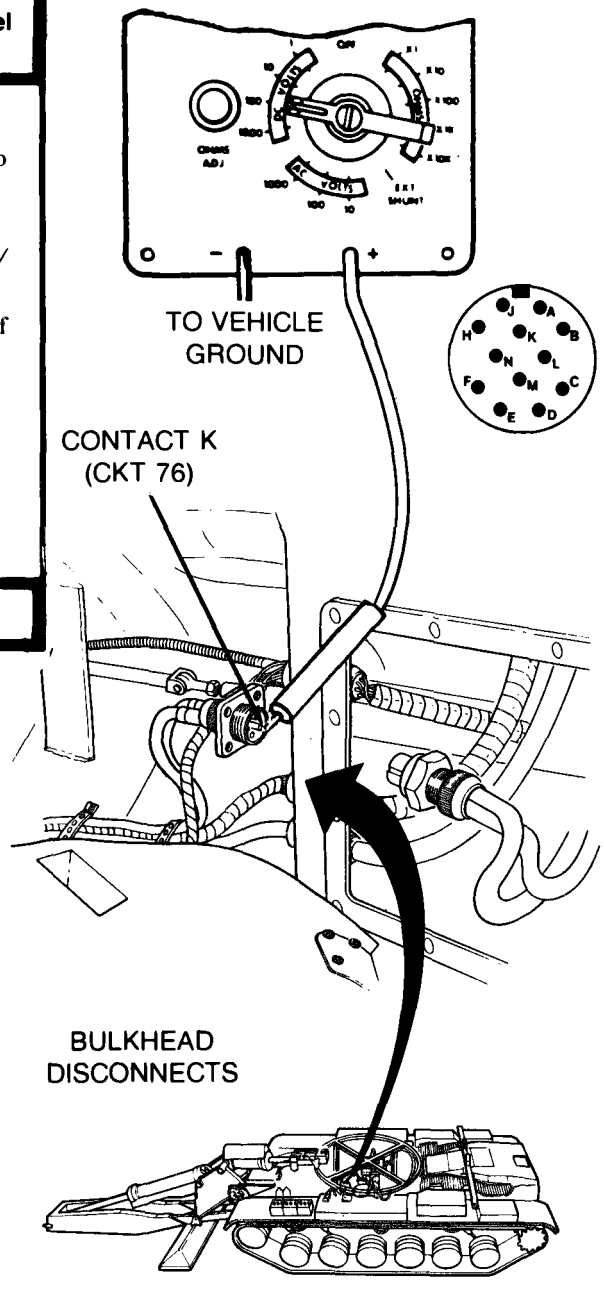
4

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 76 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Install front accessory harness connector to bulkhead disconnect (page 10-270).**

NO



YES



TA250054

Symptom-5

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

5 **Check engine disconnect harness (CKT 76) at right fuel pump connector for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Install front accessory harness connector to bulkhead disconnect (page 10-270).

First Technician (Rear of Crew Compartment)

- Remove right fuel tank access panel (TM 5-5420-202-34).
- Disconnect engine disconnect harness connector (CKT 76) from capacitor connector and housing assembly at right fuel tank fuel pump.
- Connect red probe of meter to CKT 76 of engine disconnect harness connector and black probe to ground.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Crew Compartment)

- Check if meter indicates 18 to 30 volts dc.

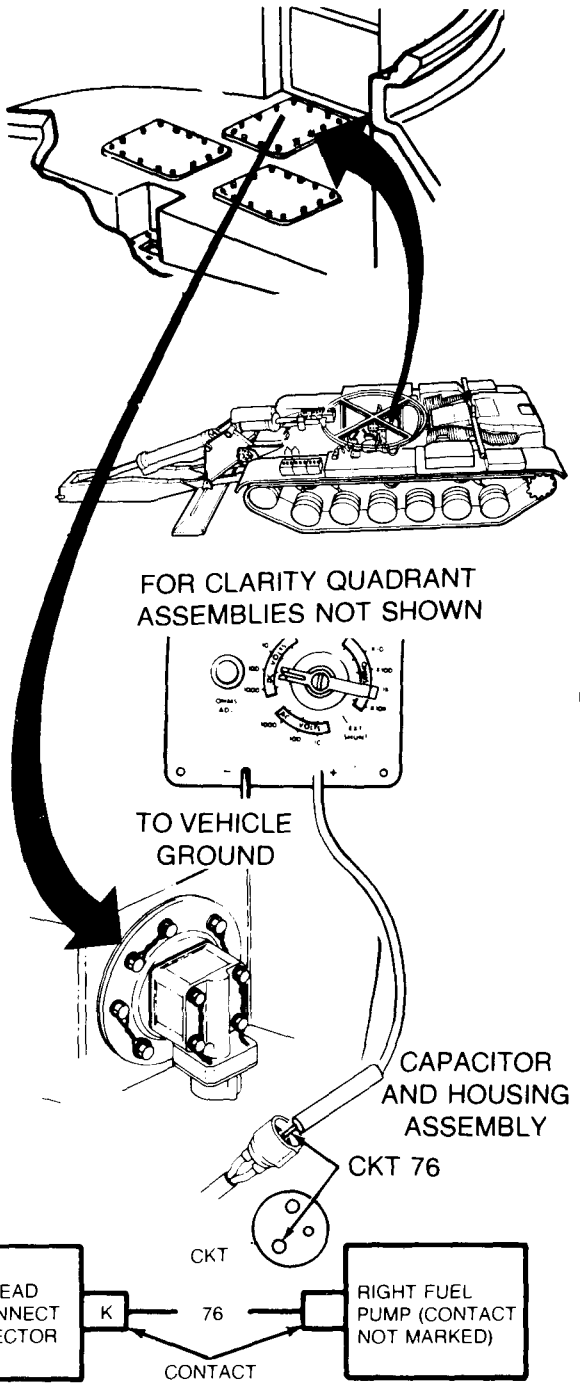
Does meter indicate 18 to 30 volts dc?

NO

6

- **Inspect engine disconnect harness for bent/broken connector contacts or loose CKT 76 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify supoort maintenance of a defective engine disconnect harness.**
- **Connect engine disconnect harness connector (CKT 76) to capacitor and housing assembly at right fuel tank fuel pump.**

YES



TA250055

Symptom-5

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

7 **Check circuit 76 for continuity from connector contact to capacitor lead connector.**

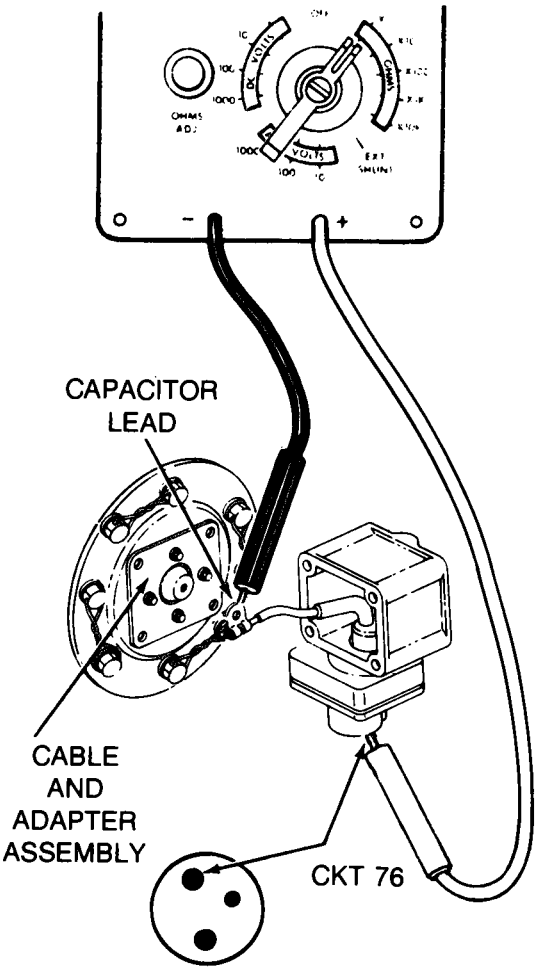
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Rear of Crew Compartment)

- Remove capacitor and housing assembly from cable and adapter assembly **(page 10-326).**
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 **(page 4-83).**
- Connect red probe of meter to capacitor and housing assembly connector contact (CKT 76).
- Connect black probe of meter to capacitor lead connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

NO

8 **Repair capacitor and housing assembly (page 10-326).**

TA250056

Symptom-5

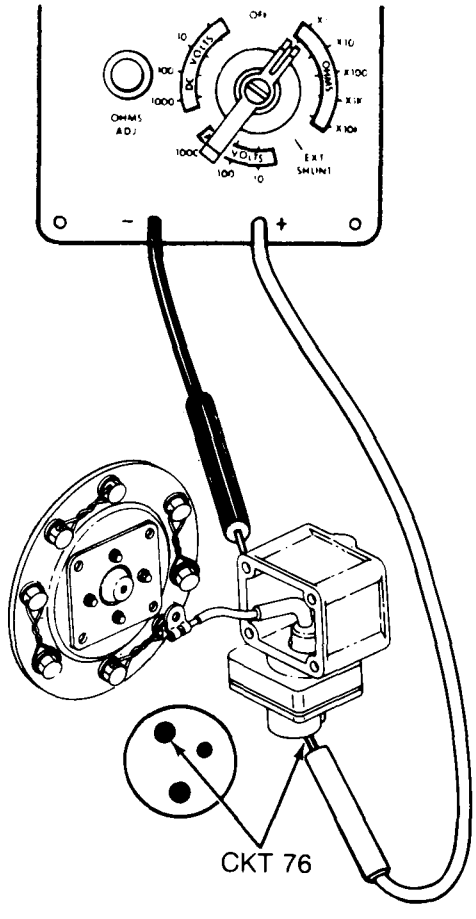
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

9 **Check capacitor lead for internal short.**

First Technician (Rear of Crew Compartment)

- Connect red probe of meter to capacitor and housing assembly connector contact (CKT 76).
- Connect black probe of meter to outside of the capacitor and housing assembly.
- Check if meter indicates continuity.

Does meter indicate continuity?



NO

YES

10 **Repair capacitor and housing assembly (page 10-326).**

TA250057

Symptom-5

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

WARNING

Do not smoke or allow flames or sparks within area while draining tanks. Have manned fire extinguisher present.

11 **Check for continuity from adaptor assembly to fuel pump connector.**

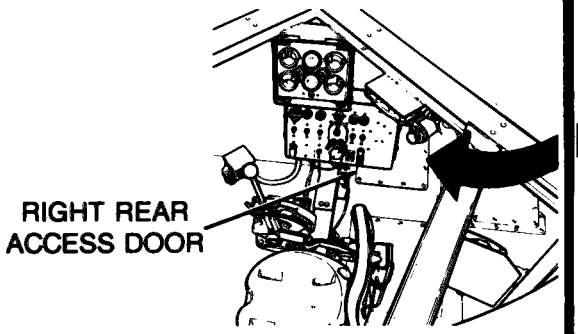
Second Technician (Rear Under Side of Hull)

- Isolate and drain right fuel tank (page 7-184).

First Technician (Rear of Crew Compartment)

- Remove right rear access plate (TM 5-5420-202-34)
- Remove right fuel pump access cover (page 7-5).
- Disconnect electrical cable from fuel pump.
- Connect black probe of meter to cable connector (CKT 76).
- Connect red probe of meter to cable and adapter assembly (CKT 76).
- Check if meter indicates continuity.

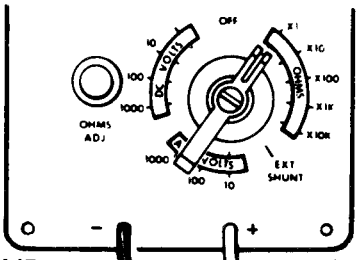
Does meter indicate continuity?

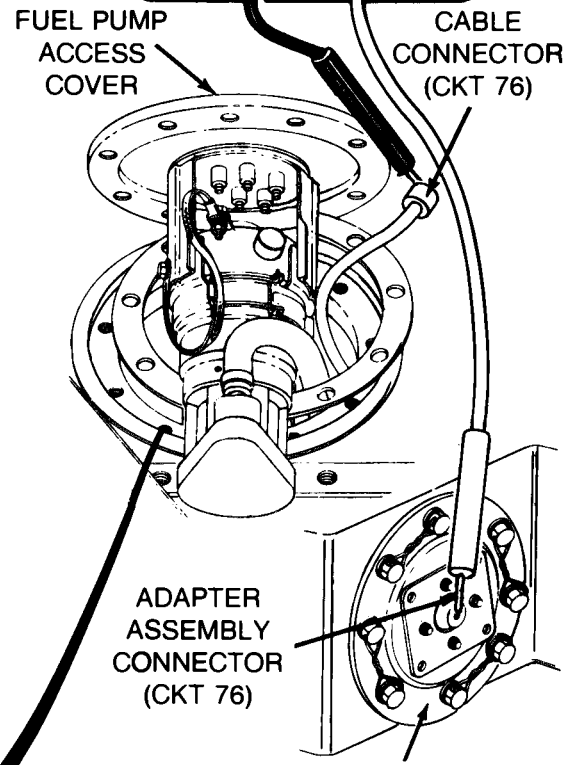


YES

NO

12 **Replace cable and adapter assembly (page 10-326).**





TA250058

Symptom-5

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

13 **Check adapter assembly cable for short to ground.**

First Technician (Rear of Crew Compartment)

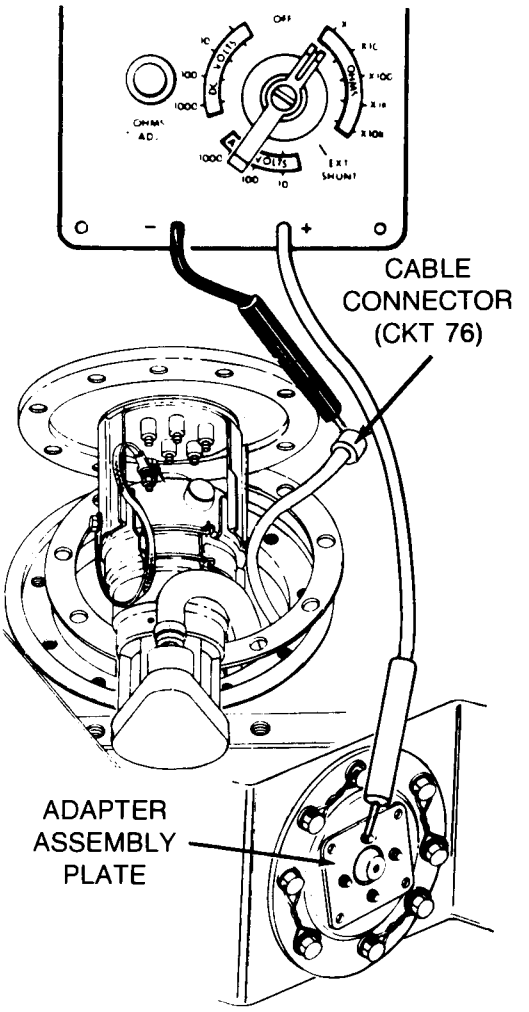
- Connect red probe of meter to adapter assembly plate.
- Connect black probe to cable connector (CKT 76).
- Check if meter indicates continuity.

Does meter indicate continuity?

YES

14 **Replace cable and adapter assembly (page 10-316).**

NO



TA250059

Symptom-5

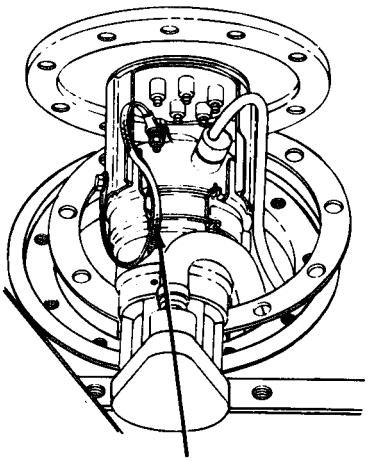
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

15 **Check ground strap on fuel pump for tightness at attaching points.**

First Technician (Rear of Crew Compartment)

- Check if connections are tight at each end of ground strap.

Are ground strap connections loose?



GROUND STRAP

YES

16
- **Tighten ground strap connections.**
- **Install capacitor and housing assembly (page 10-318).**

NO

17
- **Replace right fuel tank fuel pump (page 7-5).**
- **Install capacitor and housing assembly (page 10-318).**

TA250060

Symptom-5

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FROM STEP (2)

18 **Check front accessory harness (CKT 76) at bulkhead disconnect for electrical power to left fuel tank fuel pump.**

First Technician (Commander's Station)

- Displace front accessory harness connector (CKT 76) from rear accessory harness at bulkhead disconnect (page 10-269).
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact K (CKT 76) of front accessory harness connector at bulkhead disconnect and black probe to ground.

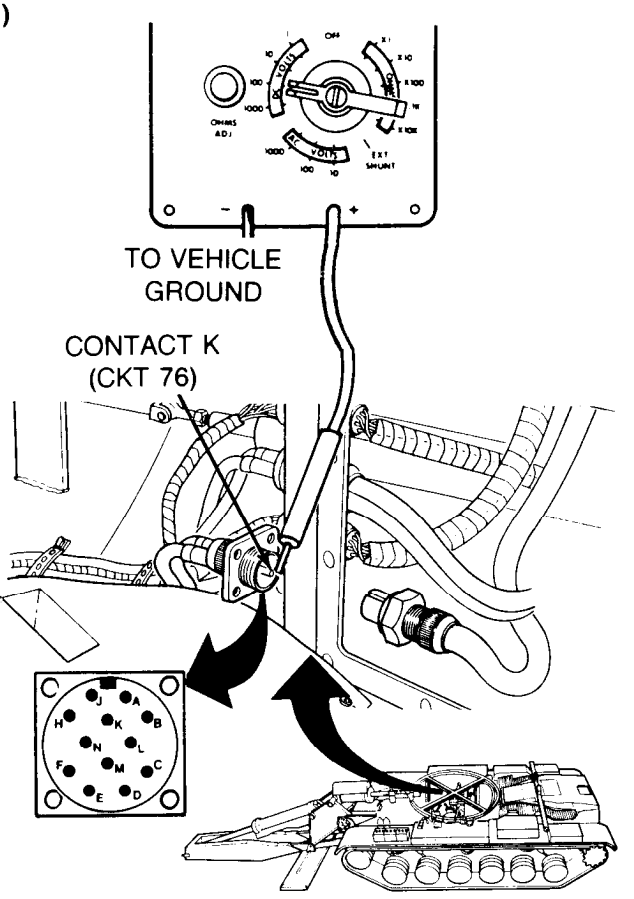
Second Technician (Operator's Station)

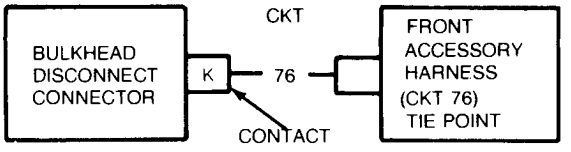
- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?





YES

NO

19

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 76 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Install front accessory harness connector to bulkhead disconnect (page 10-270).**

TA250061

Symptom-5

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

20 **Check rear accessory harness (CKT 76) at left fuel pump connector for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Install front accessory harness connector to bulkhead disconnect **(page 10-270)**.

First Technician (Outside Vehicle)

- Have powerplant removed **(page 5-2)**.
- Disconnect rear accessory harness connector (CKT 76) from capacitor connector and housing assembly at left fuel tank fuel pump.
- Connect red probe of meter to CKT 76 of rear accessory harness connector and black probe to ground.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Engine Compartment)

- Check if meter indicates 18 to 30 volts dc.

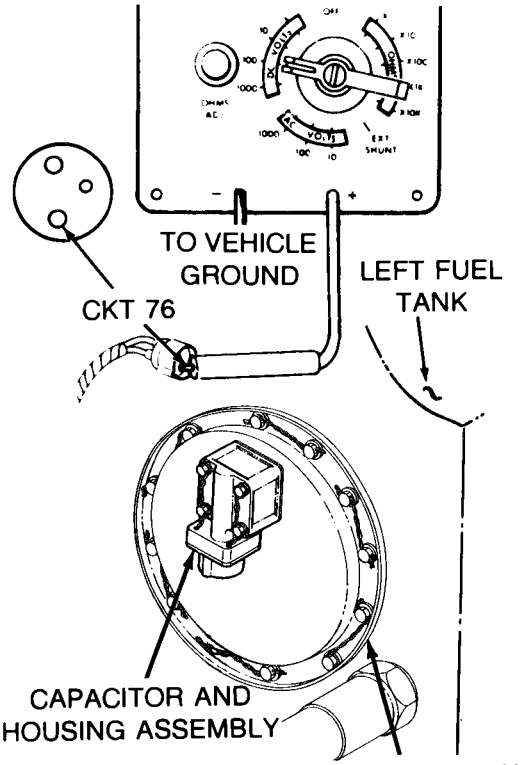
Does meter indicate 18 to 30 volts dc?

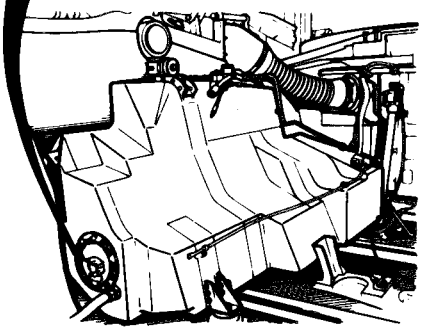
21

- **Inspect rear accessory harness for bent/broken connector contacts or loose CKT 76 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective rear accessory harness.**
- **Connect rear accessory harness connector to left fuel pump.**
- **Install powerplant (page 5-14).**

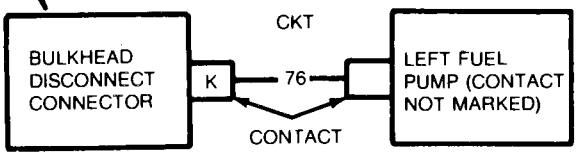
NO

YES





LEFT FUEL TANK (ENGINE REMOVED)



TA250062

Symptom-5

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

22 **Check circuit 76 for continuity from connector contact to capacitor lead connector.**

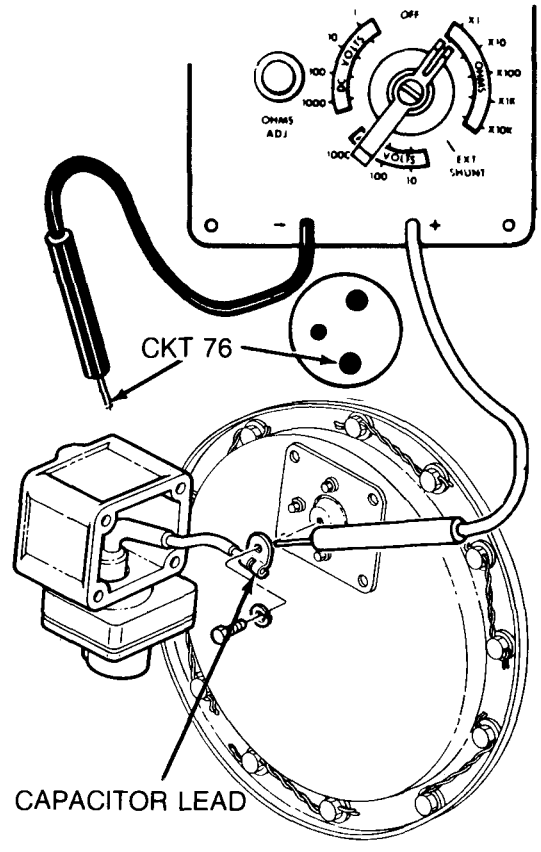
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Engine Compartment)

- Remove capacitor connector and housing assembly from cable and adapter assembly **(page 10-326)**.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 **(page 4-83)**.
- Connect red probe of meter to capacitor lead connector.
- Connect black probe of meter to capacitor and housing assembly connector (CKT 76).
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

NO

23 **Repair capacitor and housing assembly (page 10-326).**

TA250063

Symptom-5

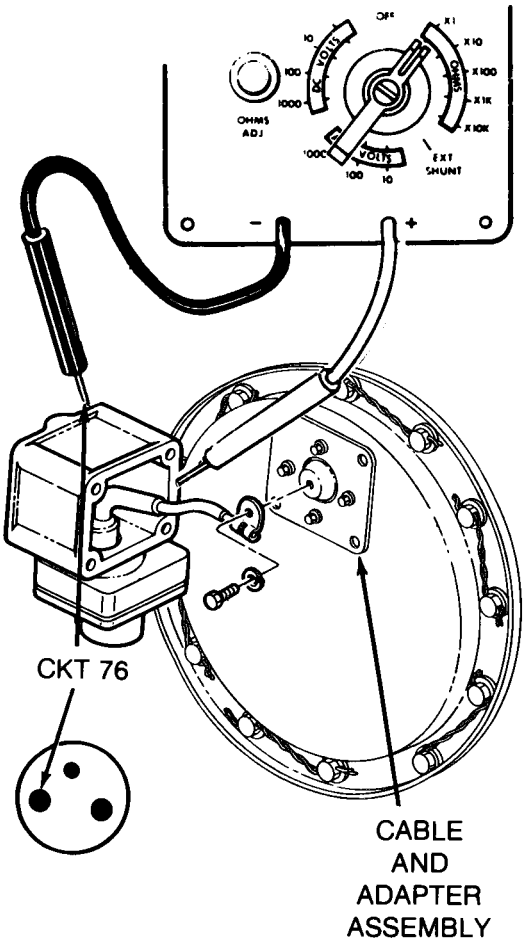
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

24 **Check capacitor lead for internal short.**

First Technician (Engine Compartment)

- Connect red probe of meter to outside of capacitor and housing assembly.
- Connect black probe of meter to capacitor and housing assembly connector contact (CKT 76).
- Check if multimeter indicates continuity.

Does multimeter indicate continuity?



NO

YES

25 **Repair capacitor and housing assembly (page 10-326).**

TA250064

Symptom-5

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

26 **Check for continuity from adaptor assembly to fuel pump connector.**

Second Technician (Rear Underside of Hull)

- Isolate and drain left fuel tank (page 7-184).

CAUTION

Remove debris, if any, to prevent it from entering fuel tank which could clog pump and fuel lines.

First Technician (Engine Compartment)

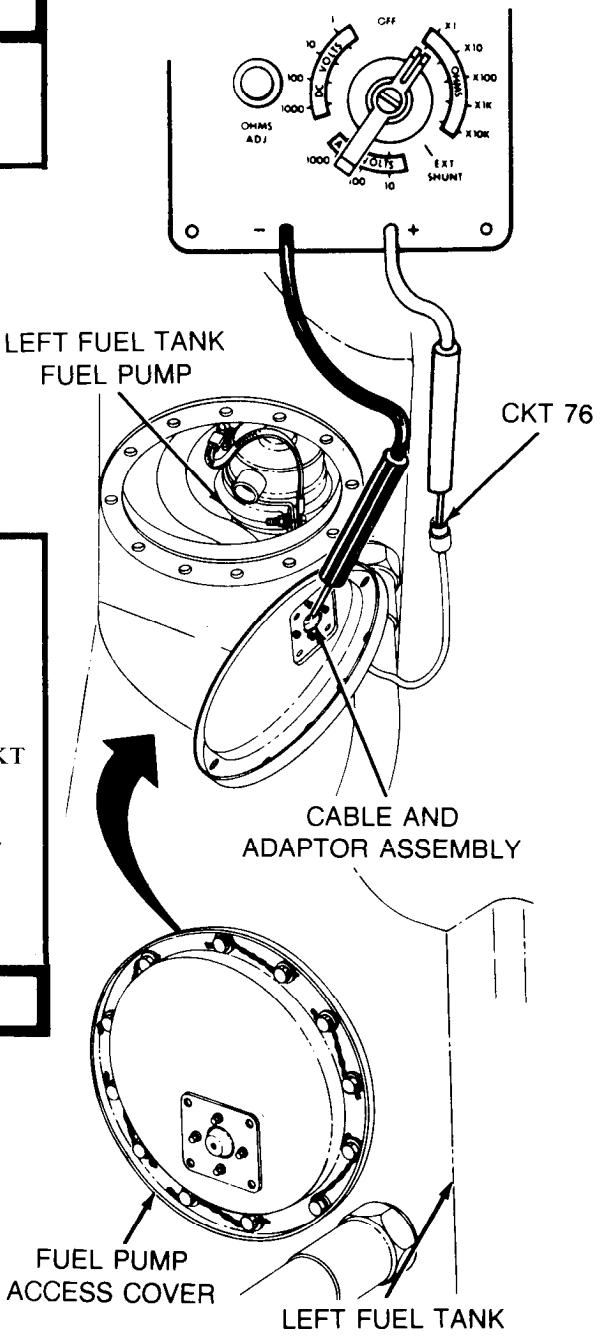
- Remove fuel pump access cover (page 7- 9).
- Disconnect electrical cable from fuel pump.
- Connect red probe of meter to cable connector (CKT 76).
- Connect black probe of meter to cable and adapter assembly connector (CKT 76).
- Check if meter indicates continuity.

Does meter indicate continuity?

27 **Replace cable and adapter assembly (page 10-321).**

NO

YES



TA250065

Symptom-5

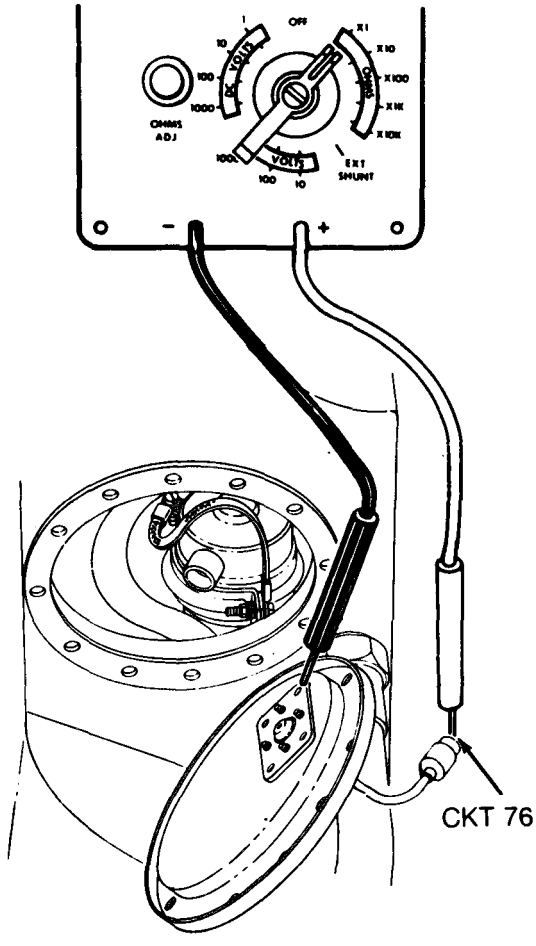
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

28 **Check adapter assembly cable for short to ground.**

First Technician (Engine Compartment)

- Connect red probe of meter to cable connector (CKT 76).
- Connect black probe of meter to adapter assembly plate.
- Check if meter indicates continuity.

Does meter indicate continuity?



NO

YES

29 **Replace cable and adapter assembly (page 10-321).**

TA250066

Symptom-5

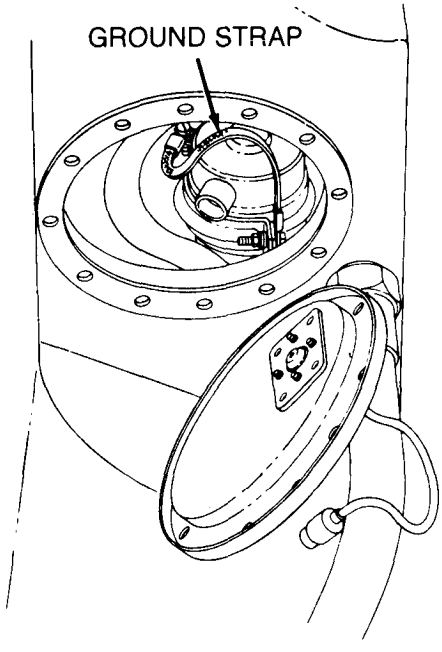
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

30 **Check ground strap on fuel pump for tightness at attaching points.**

First Technician (Engine Compartment)

- Check if connections are tight at each end of ground strap.

Are ground strap connections loose?



YES

31
- **Tighten ground strap connections.**
- **Install capacitor and housing assembly (page 10-324).**

NO

32
- **Replace left fuel tank fuel pump (page 7-11).**
- **Install capacitor and housing assembly (page 10-324).**

TA250067

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING

Symptom-6

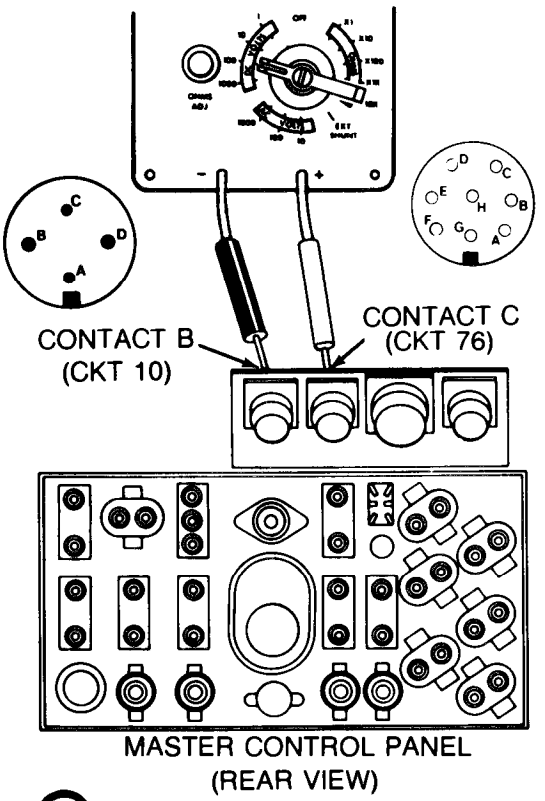
BOTH ELECTRICAL FUEL PUMPS WILL NOT WORK.

1 Check master control panel starting harness (CKT 76) for continuity.

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel starting harness from master control panel.
- Disconnect basket-control panel power harness from master control panel.
- Set multimeter to OHMS X1 scale and zero meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to master control panel starting harness panel connector contact C (CKT 76).
- Connect black probe of meter to master control panel power harness panel connector contact B (CKT 10).
- Set FUEL PUMPS switch ON.
- Check if meter indicates continuity.

Does meter indicate continuity?



MASTER CONTROL PANEL
(REAR VIEW)

NO

YES

2
- **Check basket-control panel starting harness (CKT 76) for continuity.**
- **See Step (12) .**

TA250068

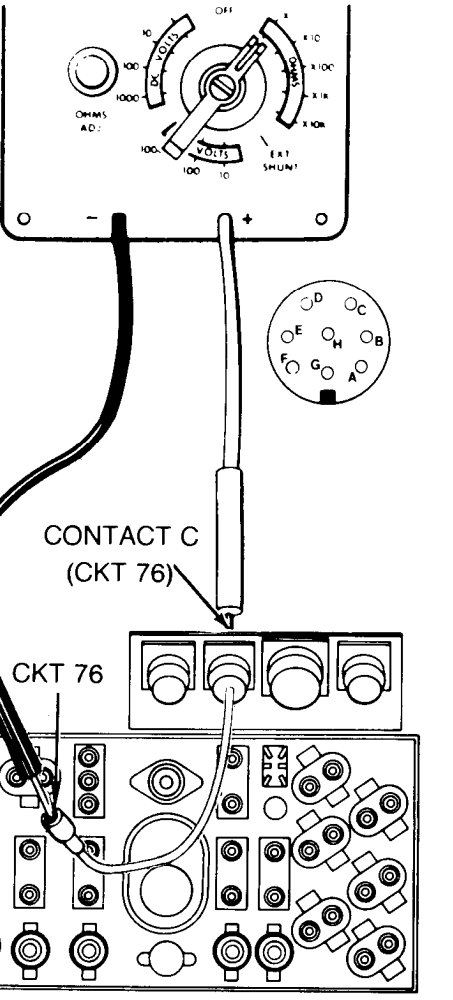
Symptom-6

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

3 **Check master control panel starting harness (CKT 76) for continuity from FUEL PUMPS switch to panel connector contact C.**

- Connect basket-control panel power harness connector to master control panel.
- Disconnect master control panel starting harness connector (CKT 76) from FUEL PUMPS switch.
- Connect black probe of meter to starting harness connector (CKT 76) at FUEL PUMPS switch.
- Connect red probe of meter to contact C at master control panel starting harness connector (CKT 76).
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

NO

4 **Replace master control panel starting harness (page 10-97).**

TA250069

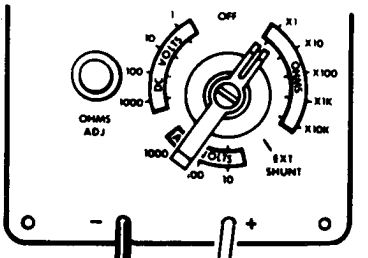
Symptom-6

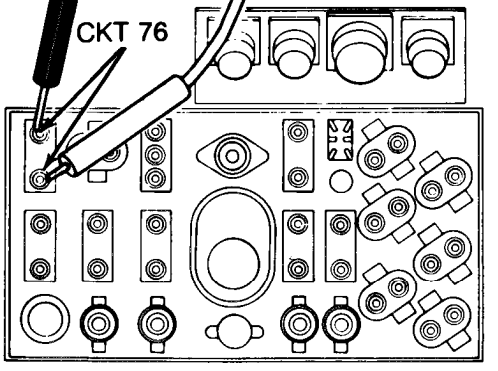
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

5 **Check FUEL PUMPS switch for continuity.**

- Connect basket-control panel starting harness to the master control panel.
- Disconnect other FUEL PUMPS switch connector (CKT 76) from fuel shut off harness connector.
- Connect meter probes to both connectors of FUEL PUMPS switch (CKTs 76).
- Check if meter indicates continuity.

Does meter indicate continuity?





YES

NO

6 **Replace FUEL PUMPS switch (page 10-47).**

TA250070

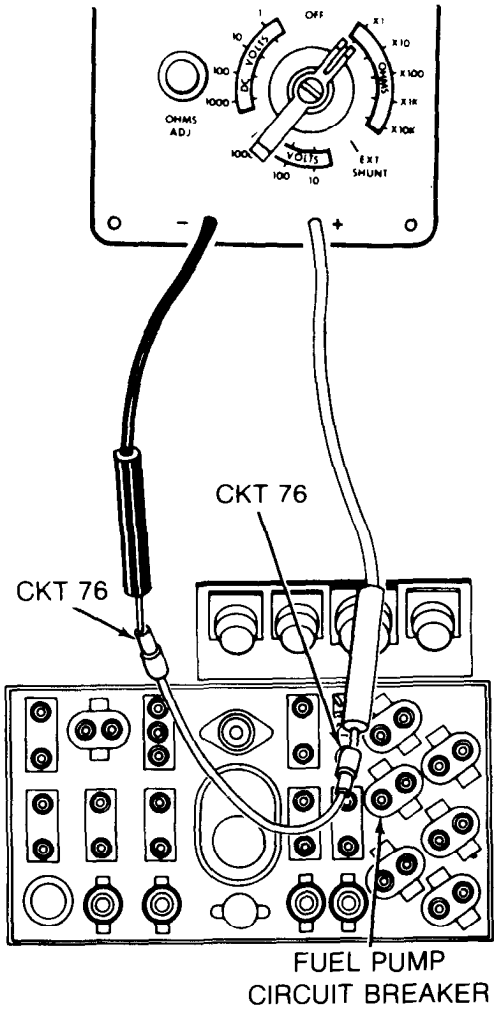
Symptom-6

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

7 **Check master control panel fuel shut off harness (CKT 76) for continuity from FUEL PUMPS switch to fuel pumps circuit breaker.**

- Remove harness junction at fuel pumps circuit breaker from mounting.
- Disconnect fuel shutoff harness connector (CKT 76) from fuel pumps circuit breaker.
- Connect red probe of meter to fuel shut off harness connector (CKT 76) at fuel pumps circuit breaker.
- Connect black probe of meter to fuel shut off harness connector (CKT 76) at FUEL PUMPS switch.
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

NO

8 **Replace master control panel fuel shut off harness (page 10-109).**

TA250071

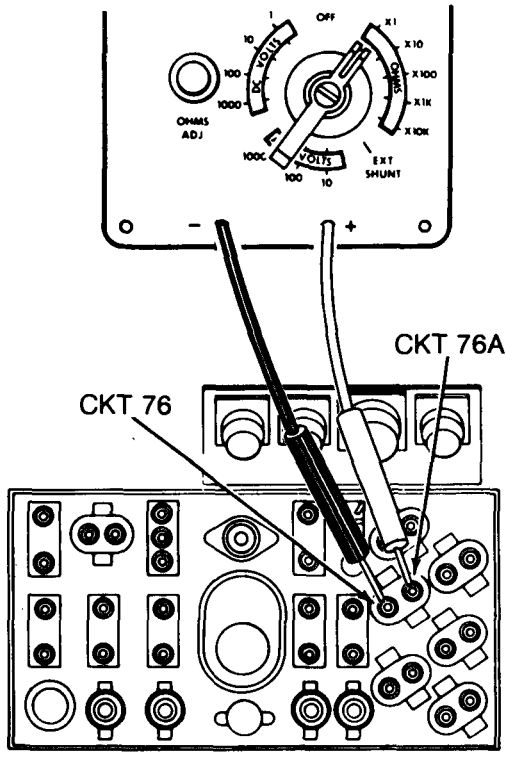
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

Symptom-6

9 **Check FUEL PUMPS circuit breaker for continuity.**

- Reconnect master control panel fuel shutoff harness to FUEL PUMPS switch.
- Reconnect master control panel starting harness to FUEL PUMPS switch.
- Disconnect CKT 76A connector from fuel pumps circuit breaker.
- Connect red probe of meter to CKT 76A connector on fuel pump circuit breaker.
- Connect black probe of meter to CKT 76 connector on fuel pumps circuit breaker.
- Check if meter indicates continuity.

Does meter indicate continuity?



NO

10 **Replace fuel pump circuit breaker (page 10-70).**

YES

11
- **Replace master control panel power harness (page 10-97).**
- **Reconnect CKT 76 connector to fuel pump circuit breaker.**

TA250072

Symptom-6
FROM STEP
2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

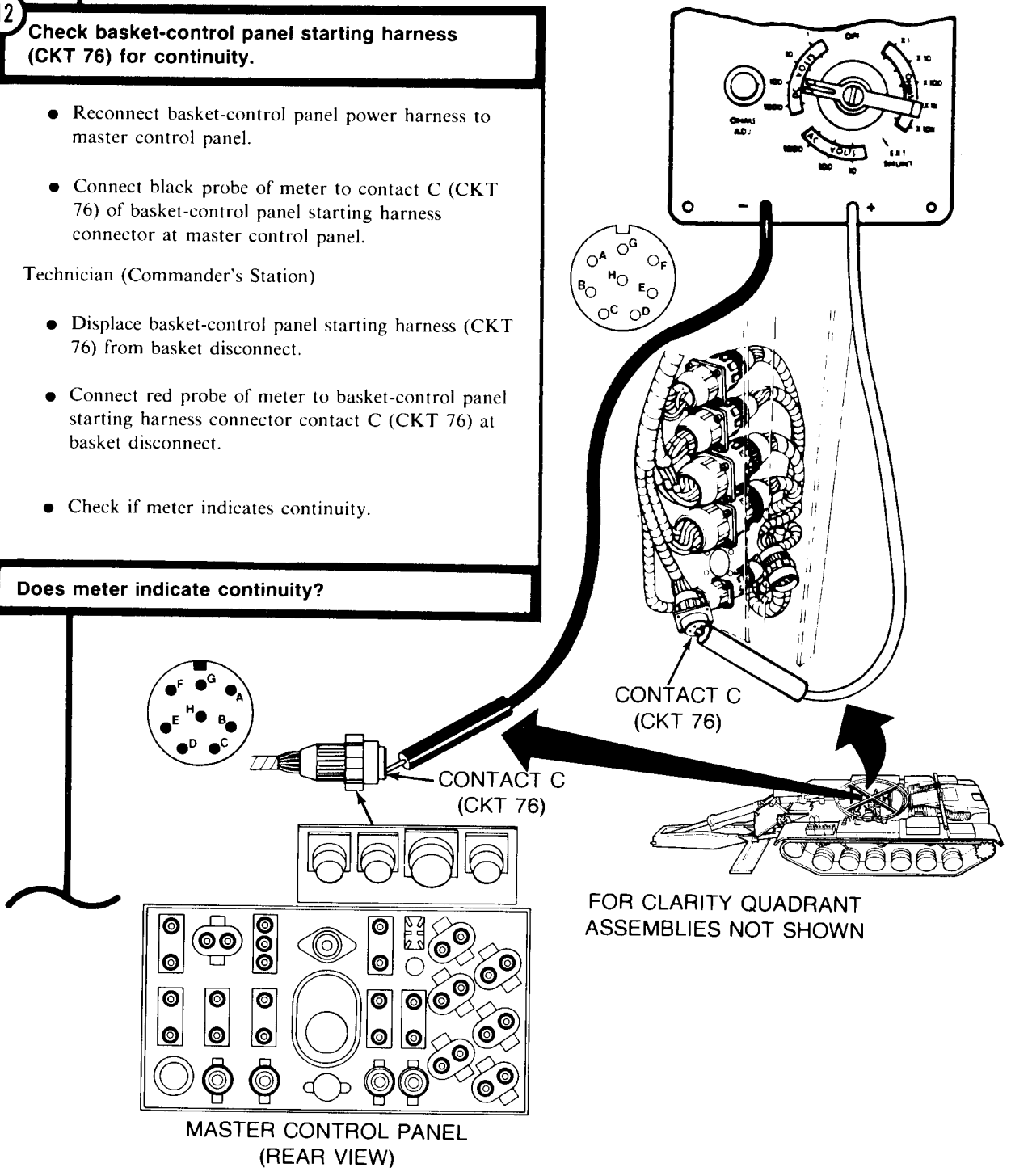
12 **Check basket-control panel starting harness (CKT 76) for continuity.**

- Reconnect basket-control panel power harness to master control panel.
- Connect black probe of meter to contact C (CKT 76) of basket-control panel starting harness connector at master control panel.

Technician (Commander's Station)

- Displace basket-control panel starting harness (CKT 76) from basket disconnect.
- Connect red probe of meter to basket-control panel starting harness connector contact C (CKT 76) at basket disconnect.
- Check if meter indicates continuity.

Does meter indicate continuity?



TA250073

Symptom-6 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, STOPPING
(Continued)

STEP (12) CONTINUED

13

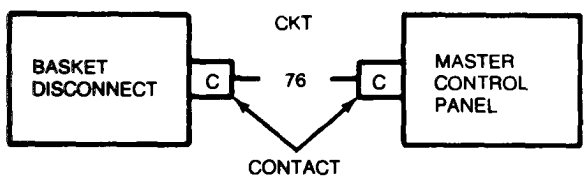
- **Inspect basket-control panel starting harness for bent/ broken connector contacts or loose CKT 76 wires at the rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of defective basket-control panel starting harness.**
- **Install basket-control panel starting harness connector at basket disconnect.**
- **Connect basket-control panel starting harness connector to master control panel.**
- **Install master control panel (page 10-33).**

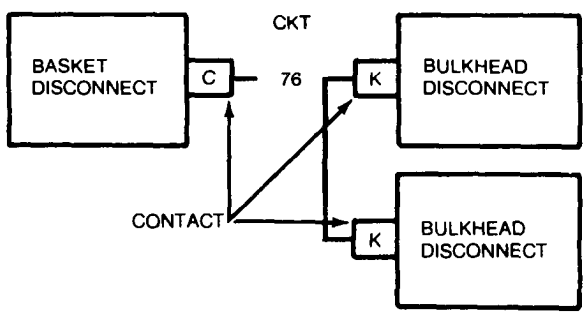
NO

YES

14

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 76 wires at the rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of defective front accessory harness.**
- **Install basket-control panel starting harness connector at basket disconnect.**
- **Connect basket-control panel starting harness connector to master control panel.**
- **Install master control panel (page 10-33).**





TA250074

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING

Symptom-7

PRIMER PUMP WILL NOT WORK.

NOTE

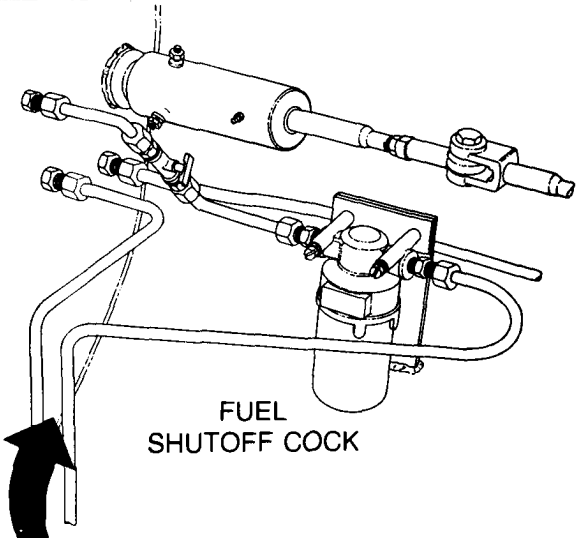
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

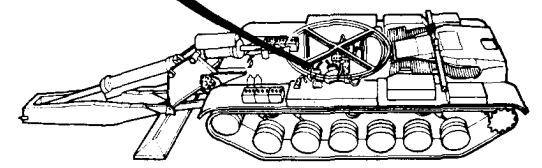
1 **Check if fuel shutoff cock is open.**

Second Technician (Operator's Station)

- Check if fuel shutoff cock is open by rotating counterclockwise.

Is fuel shutoff cock open?





FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

YES

NO

2 **Open fuel shutoff cock.**

TA250075

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

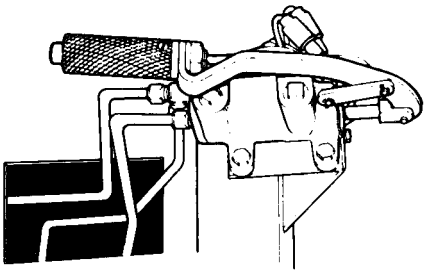
Symptom-7

3 **Check primer pump back pressure.**

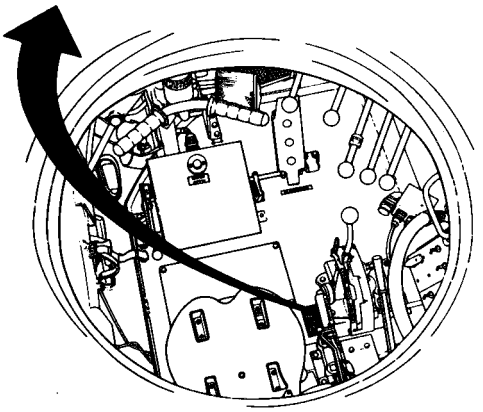
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.
- Operate primer pump several times, then set FUEL PUMPS switch OFF.

Does pressure required to operate primer pump become too hard?



PRIMER PUMP



NO

YES

4

- **Check for free fuel flow from primer pump pressure line at left hull bulkhead.**

- **See Step (21) .**

TA250076

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

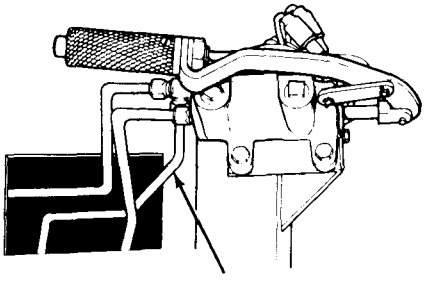
Symptom-7

5 **Check for free fuel flow from fuel inlet line at primer pump.**

Second Technician (Operator's Station)

- Disconnect fuel supply line at primer pump inlet.
- Place a container under open line to catch any fuel.
- Set FUEL PUMPS switch ON then OFF.

Does fuel flow freely from fuel supply line?



YES

NO

6

- **Check for free fuel flow from primer pump supply line at bulkhead connection.**
- **See Step (12) .**

TA250077

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

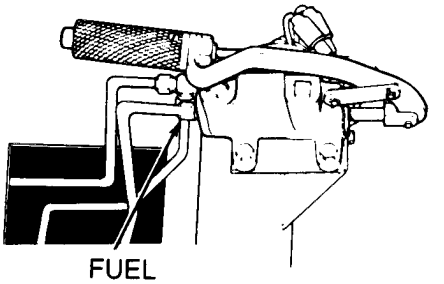
Symptom-7

7 **Check for free fuel flow at primer pump pressure line outlet.**

Second Technician (Operator's Station)

- Connect fuel supply line to primer pump.
- Disconnect pressure fuel line at primer pump.
- Place a container under primer pump to catch any fuel coming out.
- Set FUEL PUMPS switch ON, operate primer pump, then set switch OFF.

Does fuel spurt freely from primer pump outlet?



FUEL PRESSURE LINE

YES

NO

8 **Replace primer pump (page 7-282).**

TA250078

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

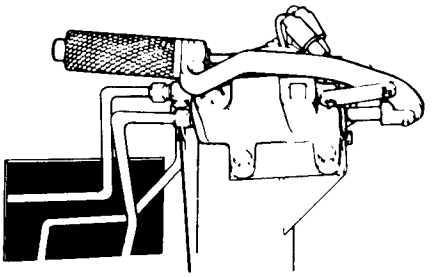
Symptom-7

9 **Check primer pump operation with primer pump outlet plugged.**

Second Technician (Operator's Station)

- Install a plug in primer pump outlet opening.
- Operate primer pump.

Does primer pump become hard to operate and lock up?



NO

10 **Replace primer pump (page 7-282).**

YES

11

- **Remove plug from primer pump outlet.**
- **Connect pressure fuel line at primer pump.**
- **Check for free fuel flow from primer pump pressure line at left hull bulkhead.**

- **See Step (21) .**

TA250079

Symptom-7 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

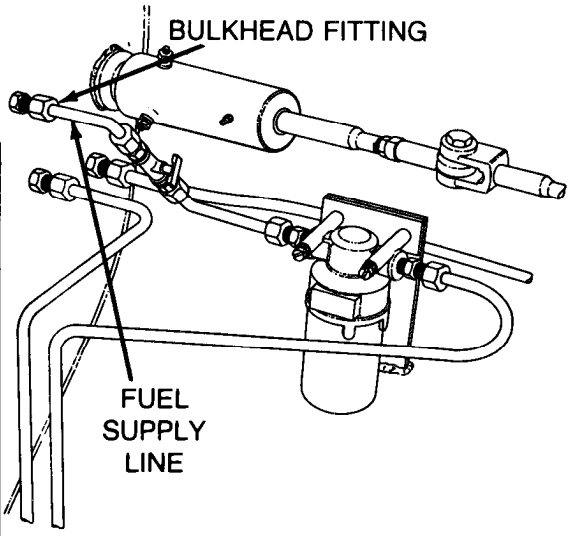
FROM STEP (6)

(12) Check for free fuel flow from primer pump supply line at bulkhead connection.

Second Technician (Operator's Station)

- Connect fuel supply line to primer pump.
- Disconnect fuel supply line at bulkhead fitting.
- Place a container under open line to catch any fuel.
- Set FUEL PUMPS switch ON then OFF.

Does fuel flow freely from bulkhead fitting?



LEFT HULL BULKHEAD VIEWED FROM OPERATOR'S STATION

YES

NO

(13)
- **Check for free fuel flow from primer pump supply line in engine compartment.**

- **See Step (47) .**

TA250080

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

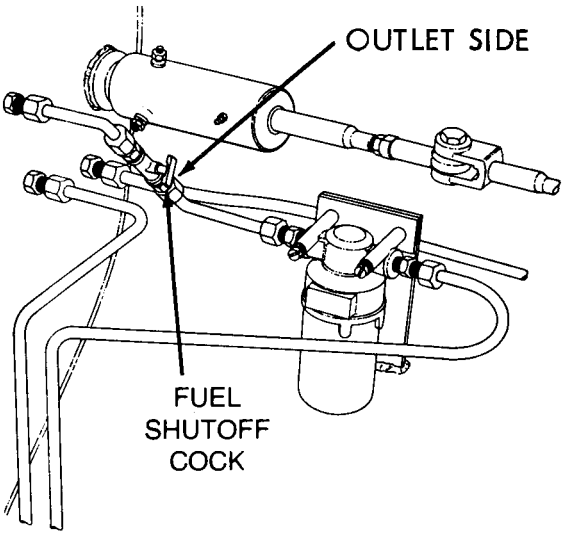
Symptom-7

14 **Check for free fuel flow from outlet connection at fuel shutoff cock.**

Second Technician (Operator's Station)

- Connect fuel supply line at bulkhead fitting.
- Disconnect fuel supply line at outlet side of fuel shutoff cock.
- Place container or rags under connection to catch any fuel.
- Set FUEL PUMPS switch ON then OFF.

Does fuel flow from fuel shutoff cock?



YES

NO

15 **Clear clogged lines and fittings between shutoff cock and bulkhead fitting by blowing with compressed air. If this does not clear lines and fitting replace them (page 7-289)**

TA250081

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

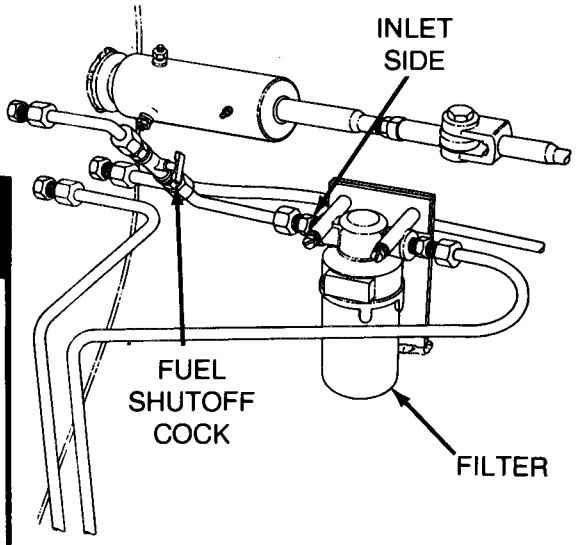
Symptom-7

16 **Check for free fuel flow from line leading to inlet side of fuel filter.**

Second Technician (Operator's Station)

- Connect fuel supply line to outlet side of shutoff cock.
- Disconnect fuel supply line from inlet side of fuel filter.
- Place a container or rags under line to catch any fuel.
- Set FUEL PUMPS switch ON then OFF.

Does fuel flow freely from disconnected line at fuel filter?



LEFT HULL BULKHEAD
(VIEWED FROM
OPERATOR'S STATION)

YES

NO

17 **Clear clogged line between fuel shutoff cock and fuel filter by blowing with compressed air. If this does not work replace line (page 7-289).**

TA250082

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

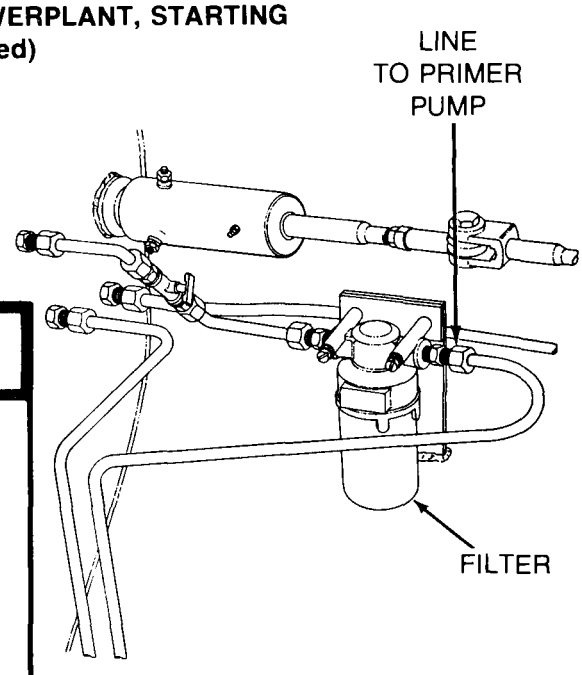
Symptom-7

18 **Check for free fuel flow at fuel filter outlet.**

Second Technician (Operator's Station)

- Connect fuel supply line to inlet side of fuel filter.
- Disconnect line from fuel filter to primer pump at fuel filter.
- Place a container or rags under fitting to catch any fuel.
- Set FUEL PUMPS switch ON then OFF.

Does fuel flow freely from fuel filter outlet?



LEFT HULL BULKHEAD
(VIEWED FROM
OPERATOR'S STATION)

NO → **19** **Replace fuel filter element (page 7-231).**

YES → **20** **Clear clogged line between fuel filter and primer pump by blowing with compressed air. If this does not work, replace line (page 7-289).**

TA250083

Symptom-7

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FROM STEP (4) OR (11)

WARNING

Wear goggles to protect eyes from spraying fuel. Fuel pressure in primer pump pressure line may reach 200 psi.

21 **Check for free fuel flow from primer pump pressure line at left hull bulkhead.**

Second Technician (Operator's Station)

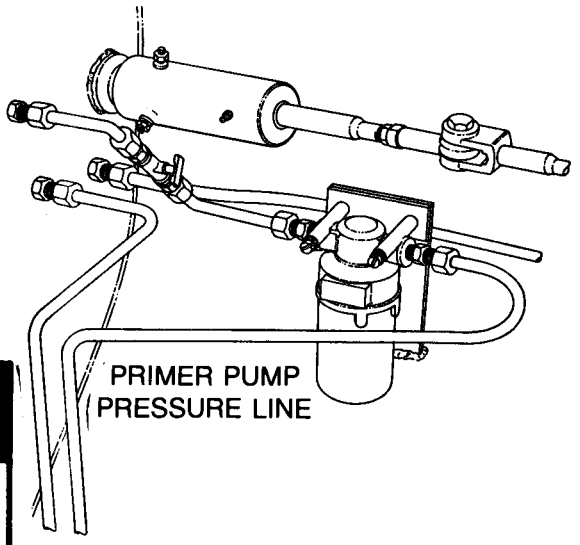
- Set MASTER BATTERY switch OFF.
- Disconnect primer pump pressure line at bulkhead fitting.
- Place a container under line to catch any fuel.
- Operate primer pump.

Does fuel flow freely from primer pump pressure line at bulkhead?

YES

NO

22 **Clear clogged line between primer pump and fitting at left hull bulkhead by blowing with compressed air. If this does not work, replace line (page 7-305).**



LEFT HULL BULKHEAD
(VIEWED FROM
OPERATOR'S STATION)

TA250084

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING

Symptom-7

23 **Check for free fuel flow from primer pump pressure line at quick disconnect in engine compartment.**

Second Technician (Operator's Station)

- Connect primer pump pressure line at bulkhead fitting.

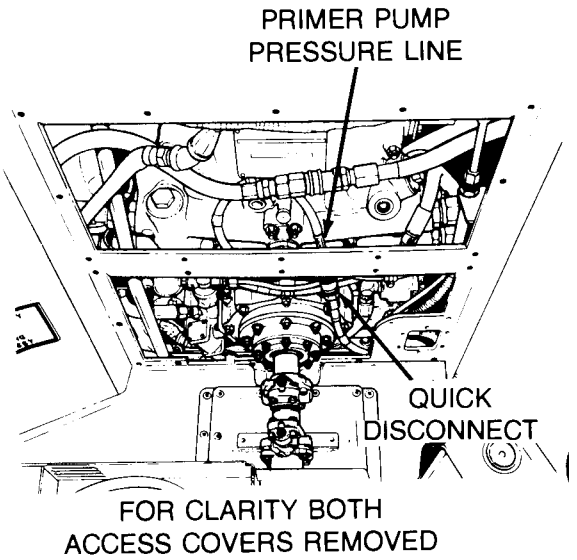
First Technician (Rear of Crew Compartment)

- Remove upper engine access cover (page 17-11).
- Separate primer pump pressure line at quick disconnect.
- Push on female end of quick disconnect with a punch or phillips screwdriver.

Second Technician (Operator's Station)

- Operate primer pump.

Does fuel flow freely from primer pump pressure line at quick disconnect?



FOR CLARITY BOTH
ACCESS COVERS REMOVED

YES

NO

24 **Clear clogged line between quick disconnect and left hull bulkhead by blowing with compressed air. If this does not work, notify support maintenance.**

TA250085

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

Symptom-7

25 **Check for free fuel flow from primer pump pressure line at backflow valve.**

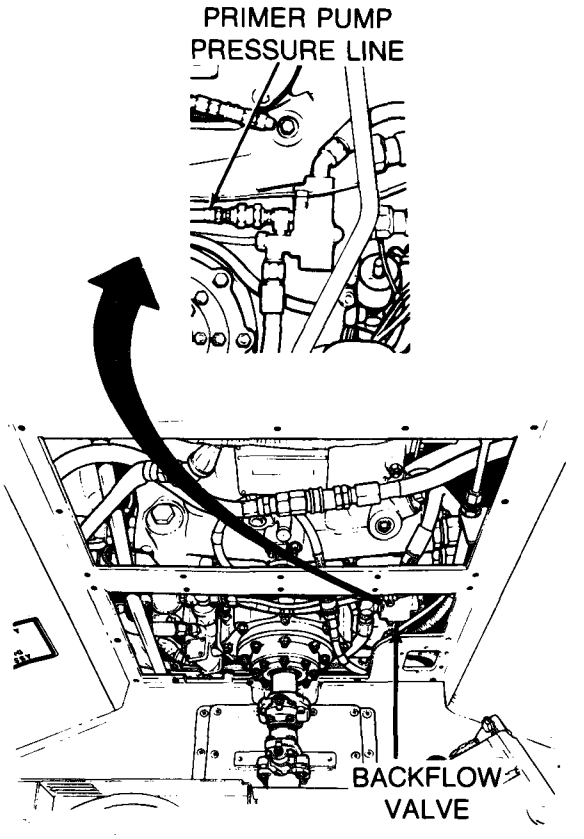
First Technician (Rear of Crew Compartment)

- Connect primer pump pressure line quick disconnect.
- Remove lower engine access cover (page 17-13).
- Disconnect primer pump pressure line at backflow valve (page 7-25).
- Place a container under line to catch any fuel.

Second Technician (Operator's Station)

- Operate primer pump.

Does fuel flow freely from line at backflow valve?



YES

NO

26 **Clear clogged line between quick disconnect and the backflow valve by blowing with compressed air. If this does not work, replace line (page 7-40).**

TA250086

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING

Symptom-7

27 **Check for free fuel flow between engine fuel pump and backflow valve.**

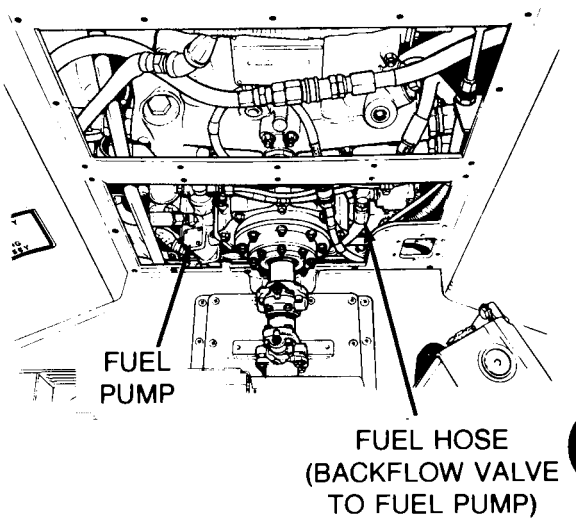
First Technician (Rear of Crew Compartment)

- Connect primer pump pressure line at backflow valve.
- Disconnect hose between backflow valve and engine fuel pump at backflow valve.
- Place a container under hose to catch any fuel.

Second Technician (Operator's Station)

- Operate primer pump.

Does fuel flow freely from backflow valve?



YES

NO

28 **Replace backflow valve (page 7-25).**

TA250087

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

Symptom-7

29 **Check for free fuel flow at inlet side of engine fuel pump.**

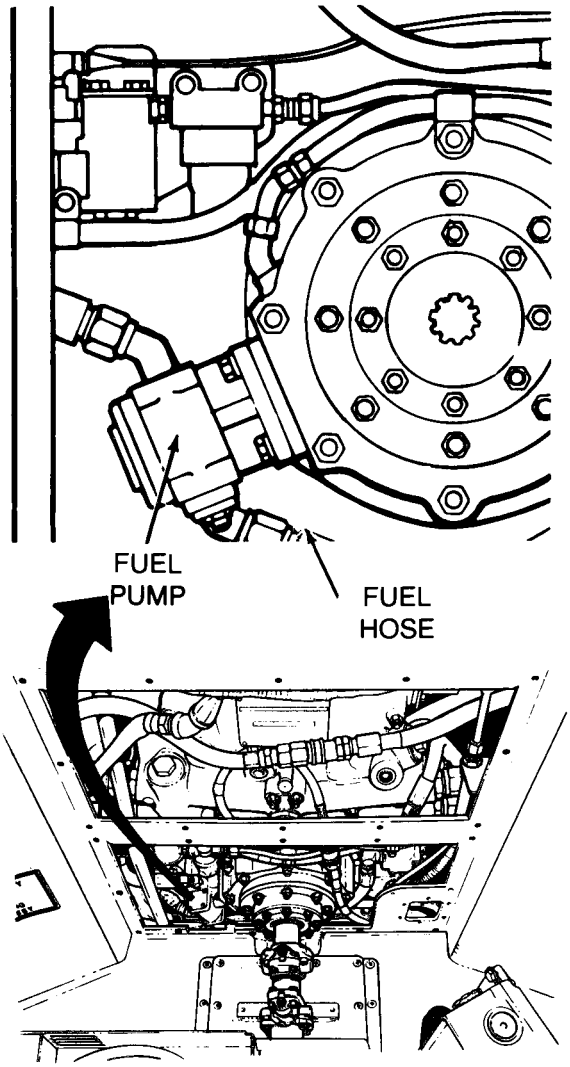
First Technician (Rear of Crew Compartment)

- Connect fuel hose to backflow valve.
- Loosen fuel hose from backflow valve to fuel pump at fuel pump.
- Place a container under hose to catch any fuel.

Second Technician (Operator's Station)

- Operate primer pump.

Does fuel flow freely from hose at engine fuel pump?



YES

NO

30 **Clear clogged hose between backflow valve and engine fuel pump by blowing with compressed air. If this does not work, replace hose (page 7-37).**

TA250088

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

Symptom-7

31 **Check for free fuel flow at outlet side of engine fuel pump.**

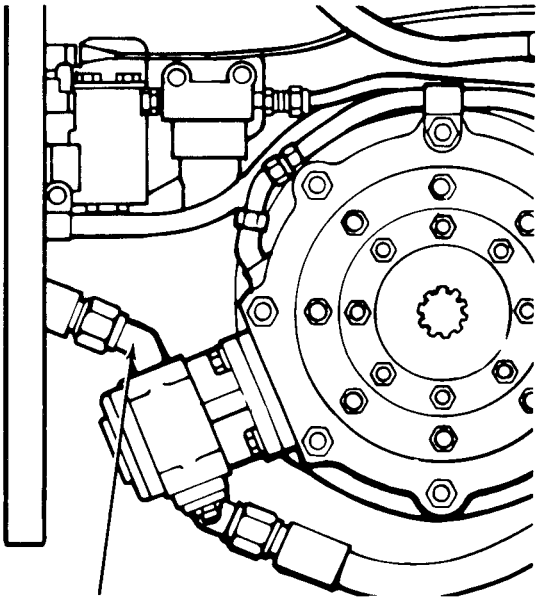
First Technician (Rear of Crew Compartment)

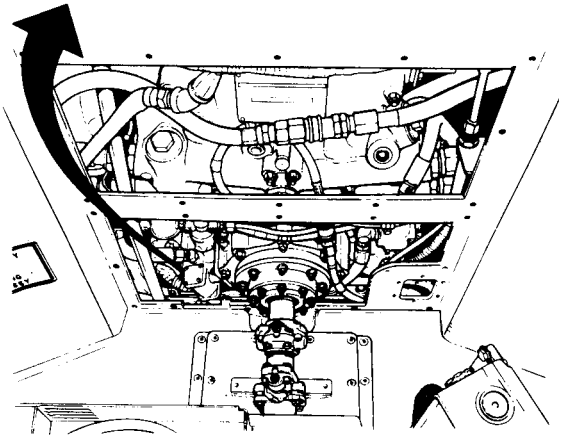
- Tighten hose between backflow valve and engine fuel pump.
- Disconnect hose between engine fuel pump and fuel water separator at fuel pump.
- Place a container under engine fuel pump to catch any fuel.

Second Technician (Operator's Station)

- Operate primer pump.

Does fuel flow freely from outlet side of engine fuel pump?





YES

NO

32 **Replace engine fuel pump (page 7-37).**

TA250089

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

Symptom-7

33 **Check for free fuel flow at fuel water separator.**

First Technician (Rear of Crew Compartment)

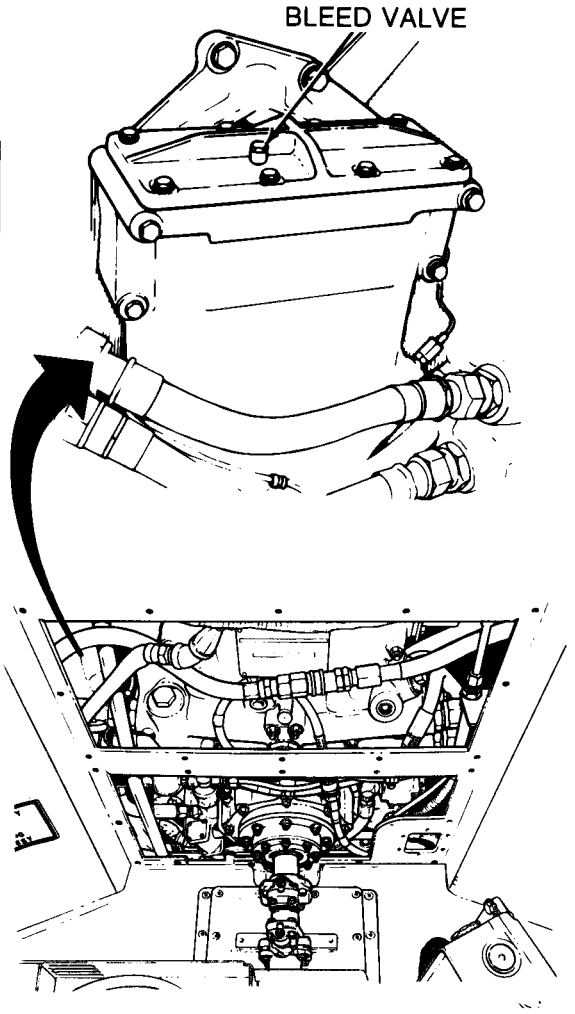
- Connect fuel hose between engine fuel pump and fuel water separator.
- Loosen bleed valve on top of fuel water separator.

Second Technician (Operator's Station)

- Operate primer pump several times.

Does fuel flow freely from fuel water separator bleed valve?

FUEL-WATER SEPARATOR



FRONT OF ENGINE
(ACCESS COVERS REMOVED)

YES

NO

34 **Clear clogged hose between engine fuel pump and fuel water separator by blowing with compressed air. If this does not work, replace hose (page 7-34).**

TA250090

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

Symptom-7

35 **Check main fuel hose from fuel water separator to engine for free fuel flow.**

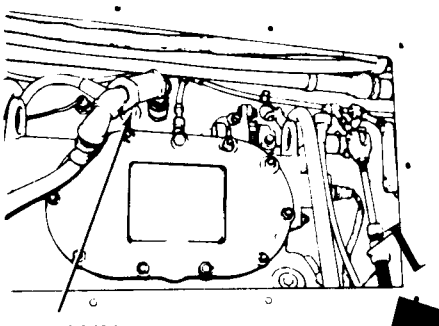
First Technician (Rear of Crew Compartment)

- Tighten bleed valve on top of fuel water separator.
- Disconnect fuel hose from fuel water separator at top of engine.
- Place a container under disconnected hose to catch any fuel.

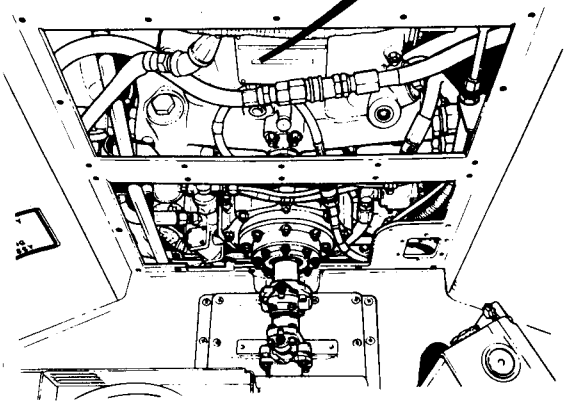
Second Technician (Operator's Station)

- Operate primer pump.

Does fuel flow freely from main fuel hose at top of engine?



MAIN
FUEL HOSE



YES

NO

36 **Clear hose between fuel water separator and engine by blowing with compressed air. If this does not work, replace hose (page 7-29).**

TA250091

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

Symptom-7

37 **Check for free fuel flow at engine fuel return hose quick disconnect.**

First Technician (Rear of Crew Compartment)

- Connect fuel hose from fuel water separator to engine.
- Install engine acces covers (page 17-12).

Both Technicians (Rear Grille Doors)

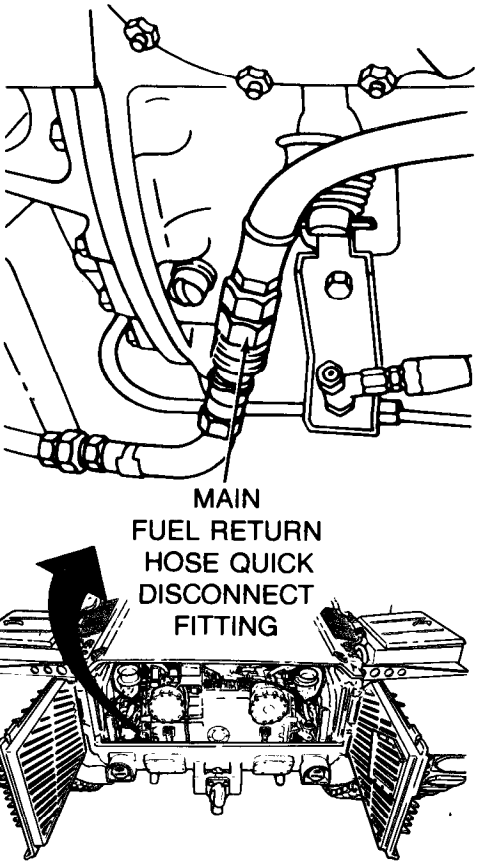
- Remove transmission shroud (page 9-2).

First Technician (Rear Grille Doors)

- Separate main fuel return hose quick disconnect.
- Place a container under disconnected hose to catch any fuel.
- Using a punch or phillips screwdriver, press in on female end of quick disconnect.

Second Technician (Operator's Station)

- Operate primer pump.



Does fuel flow freely from quick disconnect?

NO

YES

38 **Check for free fuel flow from quick disconnect on hose leading to fuel tank return selector cock.**

- **See Step (50) .**

TA250092

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

Symptom-7

39 **Check for free fuel flow from main fuel return line at top of engine.**

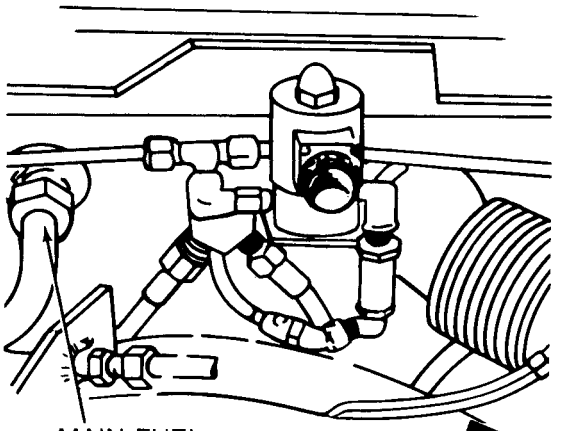
First Technician (Rear Grille Doors)

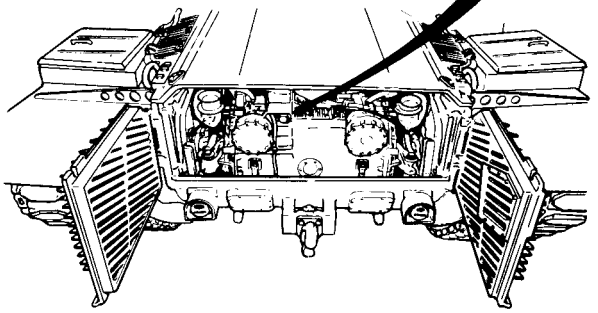
- Loosen connection in main fuel return line at top of engine.
- Place a container under loose connection to catch any fuel.

Second Technician (Operator's Station)

- Operate primer pump.

Does fuel flow freely from loose connection?





YES

NO

40

- **Check for free fuel flow from main fuel return outlet at injector pump.**
- **See Step (44) .**

TA250093

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

Symptom-7

41 **Check for free fuel flow at connection between main fuel return line tubing and flexible hose leading to quick disconnect.**

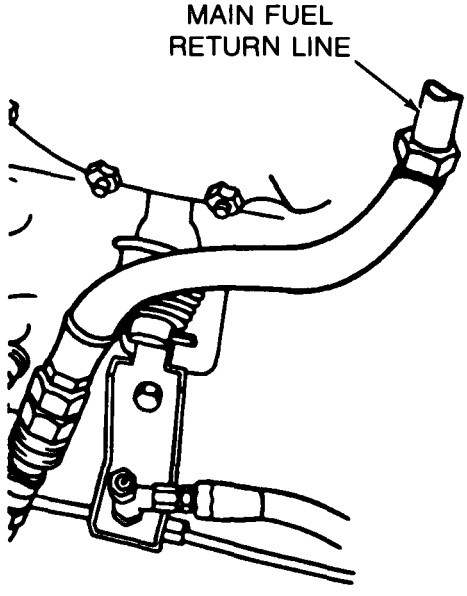
First Technician (Rear Grille Doors)

- Connect main fuel return line quick disconnect.
- Tighten main fuel return connection at top of engine.
- Loosen connection between main fuel return line and flexible hose.
- Place a container under loose connection to catch any fuel.

Second Technician (Operator's Station)

- Operate primer pump.

Does fuel flow freely from loose connection?



NO → **42** **Clear clogged line between top of engine and flexible hose by blowing with compressed air. If this does not work replace line (page 7-286).**

YES → **43** **Clear clogged hose by blowing with compressed air. If this does not work, replace flexible hose (page 7-219).**

TA250094

Symptom-7

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FROM STEP 40

44 **Check for free fuel flow from main fuel return outlet at injector pump.**

First Technician (Rear Grille Doors)

- Connect main fuel return line quick disconnect.

Both Technicians (Top Deck)

- Remove engine cooling fans (page 9-55).
- Disconnect main fuel return line at injector pump.

Second Technician (Operator's Station)

- Operate primer pump.

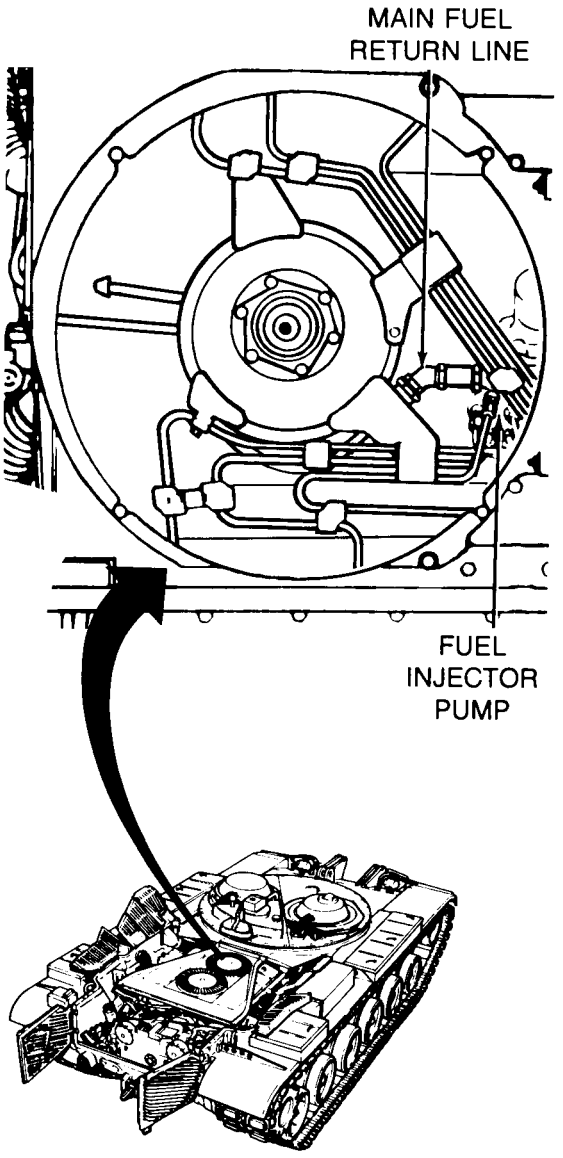
Does fuel flow freely from injector pump return outlet?

NO

45
- **Clear clogged fuel supply line between front of engine and inlet side of fuel injector pump by blowing with compressed air. If this does not work, replace line (page 7-29).**
- **Tighten connection in main fuel return line at top of engine.**

YES

46 **Clear clogged fuel return line between injector pump and the rear of engine by blowing with compressed air. If this does not work, replace line.**



TA250095

Symptom-7

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FROM STEP 13

47 Check for free fuel flow from primer pump supply line in engine compartment.

Second Technician (Operator's Station)

- Connect fuel supply line to bulkhead fitting.

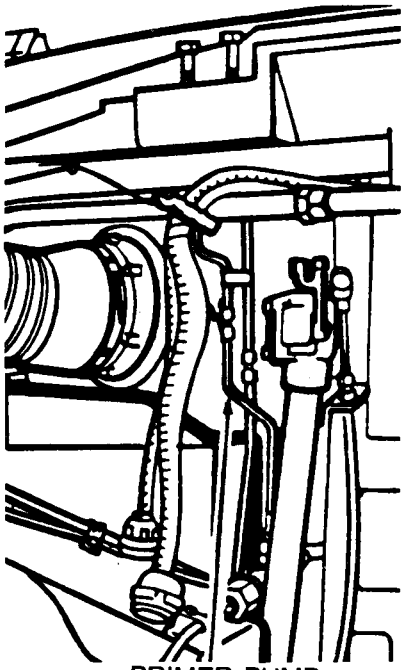
Both Technicians (Top Deck)

- Have powerplant removed (page 5-2).
- Disconnect primer pump supply line at inline connection.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON then OFF.

Does fuel flow freely from primer pump supply line in engine compartment?



PRIMER PUMP SUPPLY LINE

NO

48 Clear line between inline connector and main fuel supply by blowing with compressed air. If this does not work, replace line.

YES

49 Clear line between inline connector in engine compartment and left hull bulkhead by blowing with compressed air. If this does not work, notify support maintenance.

TA250096

Symptom-7

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FROM STEP 38

50 **Check for free fuel flow from quick disconnect on hose leading to fuel tank return selector cock.**

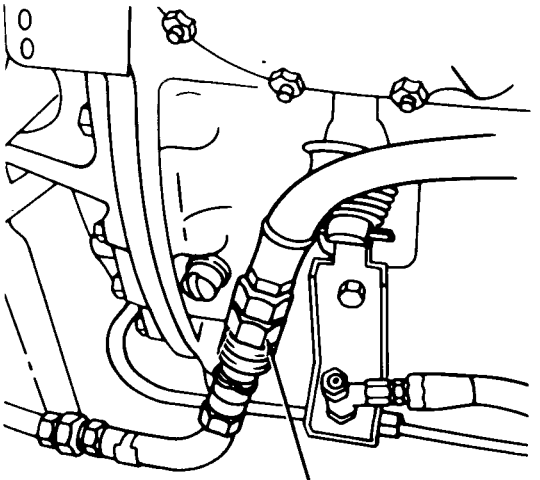
NOTE

Fuel tanks must be full to perform this check.

First Technician (Rear Grille Doors)

- Holding line as low as possible - push in on main fuel line quick disconnect with a punch or phillips screwdriver.

Does fuel flow freely from quick disconnect?



MAIN FUEL RETURN LINE QUICK DISCONNECT FITTING

NO

YES

51 **Replace main fuel line quick disconnect fitting.**

TA250097

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

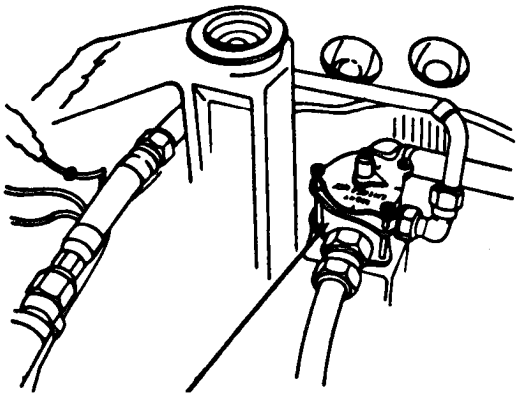
Symptom-7

52 **Check engine fuel return tank selector cock for proper position.**

First Technician (Rear Grille Doors)

- Connect main fuel return line quick disconnect.
- Observe selector cock for BOTH position.

Is return tank selector cock wired in BOTH position?



FUEL RETURN SELECTOR COCK

SHOWN WITH POWERPLANT REMOVED FOR CLARITY

YES

NO

53 **Place cock in BOTH position and lockwire.**

TA250098

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

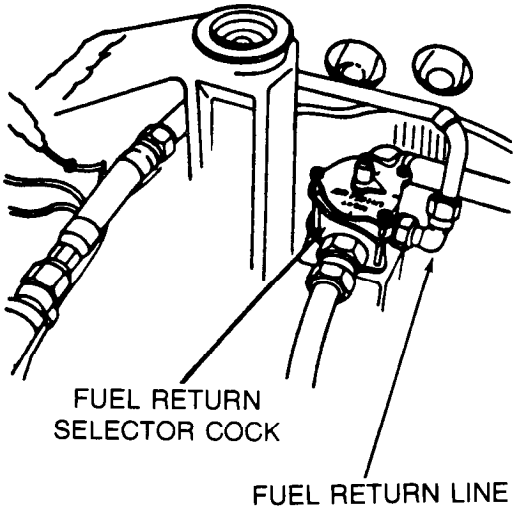
Symptom-7

54 **Check for free fuel flow at inlet side on engine fuel return tank selector cock.**

First Technician (Rear Grille Doors)

- Loosen engine fuel return line at tank selector cock.

Does fuel flow from loose connection?



NO

55 **Clear clogs from return line between quick disconnect and tank selector by blowing with compressed air. If this does not work, replace line.**

YES

56 **Replace engine fuel return tank selector cock (page 7-163).**

TA250099

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING

Symptom-8

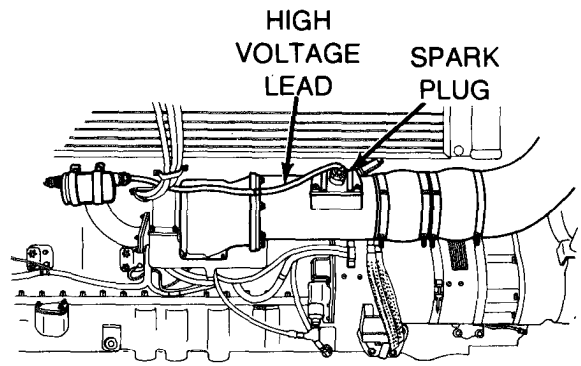
ONE INTAKE MANIFOLD PREHEATER WILL NOT WORK.

WARNING

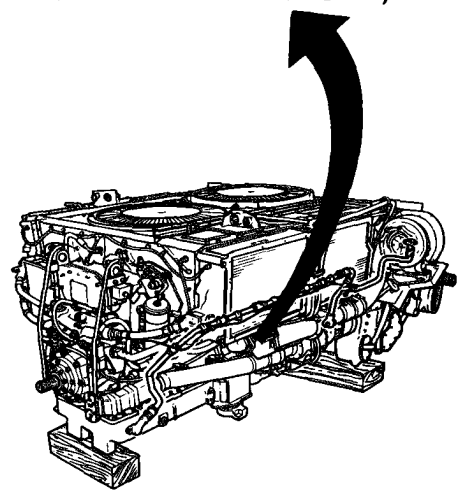
When power is on, keep hands away from high voltage ignition lead. Contact with high voltage output can cause injury or death.

NOTE

This procedure is to be performed by two persons. The lead person shall be referred to as the first technician and shall direct the activity of the second person called the second technician.



(RIGHT SIDE OF ENGINE SHOWN)



1 Check for electrical power to manifold preheater spark plug.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Top Deck)

- Have powerplant removed (page 5-2).

First Technician (Powerplant)

- Ground hop powerplant (page 5-25). Do not start engine.
- Disconnect high voltage ignition lead from spark plug of cold manifold preheater.
- Place disconnected end of high voltage ignition lead 1/4 inch from engine ground.
- Check if disconnected end of high voltage ignition lead arcs to ground when STARTER and manifold preheater switches are pressed.

TA25010

Symptom-8

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

STEP (1) CONTINUED

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

CAUTION

Do not hold STARTER switch closed for more than 14 seconds.

- Press STARTER and PREHEAT switches at the same time, hold on for approximately 10 seconds, then release.
- Set MASTER BATTERY switch OFF.

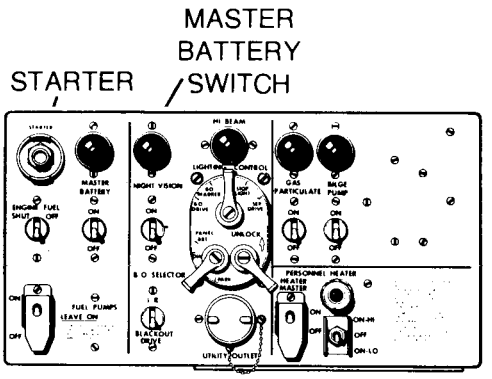
Did voltage arc to ground from high voltage ignition lead?

NO

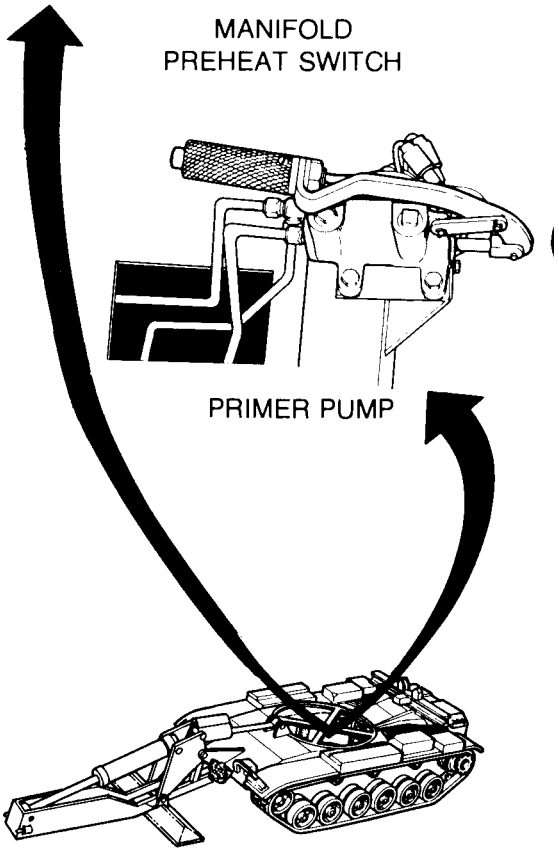
YES

(2)

- **Check for electrical power to manifold heater ignition unit (CKT 486).**
- **See Step (6).**



MASTER CONTROL PANEL



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

TA250101

Symptom-8

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

3 **Check if fuel is being supplied to spark plug of cold manifold heater.**

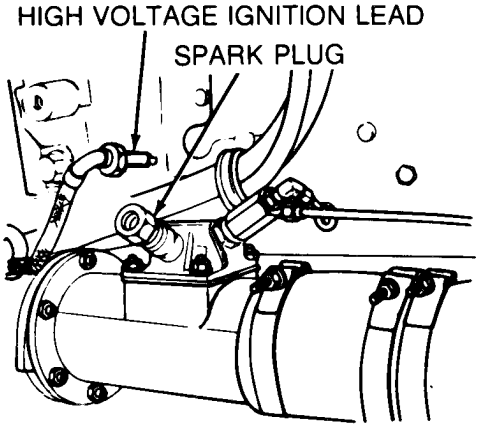
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Hold ENGINE FUEL SHUT OFF switch in OFF position.
- At the same time, press STARTER and PREHEAT switches and operate primer pump for approximately 10 seconds, then release.
- Set MASTER BATTERY switch OFF.

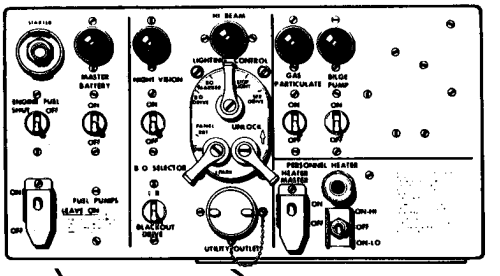
First Technician (Powerplant)

- Remove spark plug from cold manifold heater (page 7-275).
- Check electrodes of spark plug for presence of fuel.

Is spark plug wet with fuel?



MANIFOLD HEATER
(RIGHT SIDE OF ENGINE)
(LEFT SIDE SIMILAR)



ENGINE FUEL SHUT OFF SWITCH

FUEL PUMPS SWITCH

MASTER CONTROL PANEL

4 **Replace manifold heater spark plug (page 7-275).**

YES

NO

5

- **Check if fuel is being supplied to manifold heater nozzle.**

See Step (13).

TA250102

Symptom-8 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FROM STEP 2

6 Check for electrical power to manifold heater ignition unit (CKT 486).

First Technician (Powerplant)

- Disconnect engine electrical harness connector from manifold heater ignition unit at cold manifold heater.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact A (CKT 486) of engine electrical harness connector at manifold heater ignition unit and black probe to ground.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press STARTER and preheat switches at the same time, hold on for approximately 10 seconds, then release.

First Technician (Powerplant)

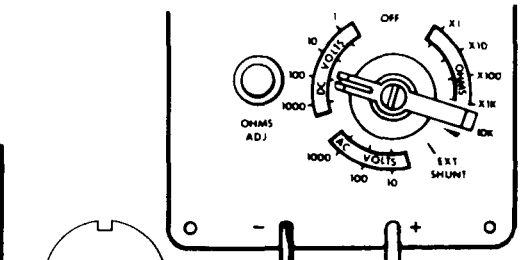
- Check if meter indicates 18 to 30 volts dc.

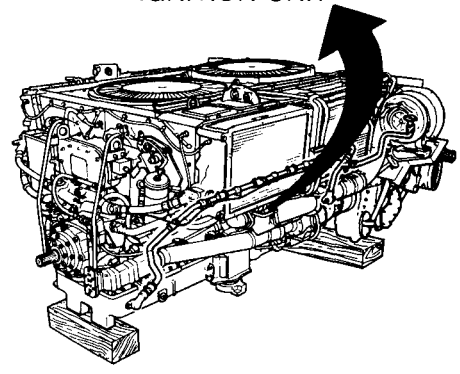
Does meter indicate 18 to 30 volts dc?

7
- **Repair engine electrical harness (CKT 486) (page 10-298).**
- **Connect high voltage ignition lead to spark plug.**

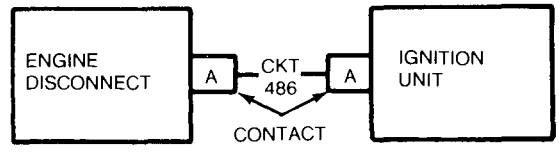
NO

YES





RIGHT SIDE OF ENGINE SHOWN



TA250103

Symptom-8

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

8 **Check engine electrical harness (CKT GND) for continuity.**

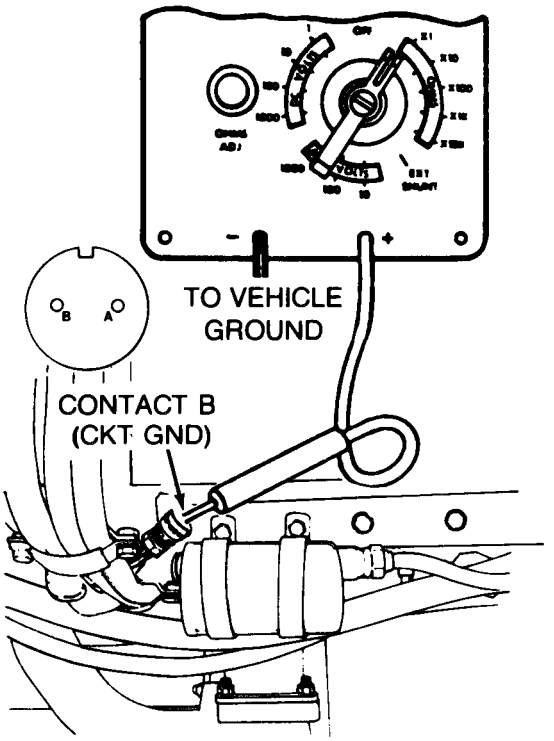
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Powerplant)

- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact B (CKT GND) of engine electrical harness connector at manifold heater ignition unit and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?

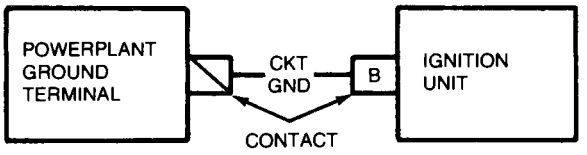


YES

NO

9

- **Repair engine electrical harness (CKT GND).**
- **Connect high voltage ignition lead to spark plug.**



TA250104

Symptom-8

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

10 Check high voltage ignition lead for short to ground.

First Technician (Powerplant)

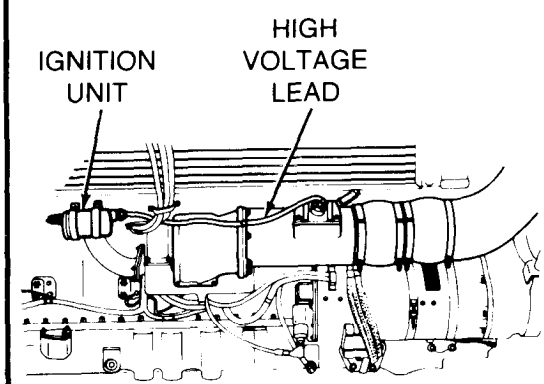
- Connect engine electrical harness connector to manifold heater ignition unit at cold manifold heater.
- Disconnect high voltage ignition lead from manifold heater ignition unit at cold manifold heater (keep this lead).
- Disconnect high voltage ignition lead from manifold heater ignition unit and spark plug at manifold heater on opposite side of engine and connect it to ignition unit and spark plug of cold manifold heater.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press STARTER and preheat switches at the same time, hold on for approximately 10 seconds, then release.

First Technician (Powerplant)

- Check if heat can be felt from manifold heater.



(RIGHT SIDE OF ENGINE SHOWN)

Did manifold heater get hot?

YES

11 Replace high voltage ignition lead (page 7-267).

NO

12
- **Replace manifold heater ignition unit (page 7-267).**
- **Install high voltage ignition lead to manifold heater without a lead.**

TA250105

Symptom-8

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FROM STEP 5

13 Check if fuel is being supplied to manifold heater nozzle.

First Technician (Powerplant)

- Connect high voltage ignition lead to spark plug of cold manifold preheater.
- Disconnect manifold heater fuel inlet line at manifold heater which is not working.

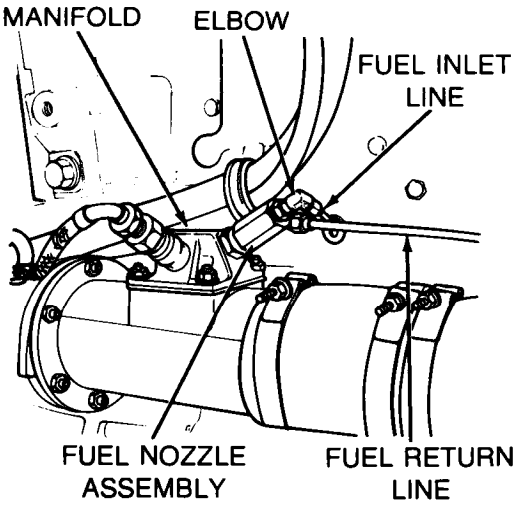
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- At the same time, press STARTER and preheat switches and operate primer pump for approximately 10 seconds, then release.

First Technician (Powerplant)

- Check for free fuel flow, at disconnected inlet line, while primer pump is being operated.

Is fuel being supplied to manifold heater nozzle?



MANIFOLD HEATER
(RIGHT SIDE OF ENGINE SHOWN)

NO → **14 Replace fuel line from solenoid valve to manifold heater nozzle (page 7-241).**

YES → **15 Replace manifold heater nozzle (page 7-281).**

TA250106

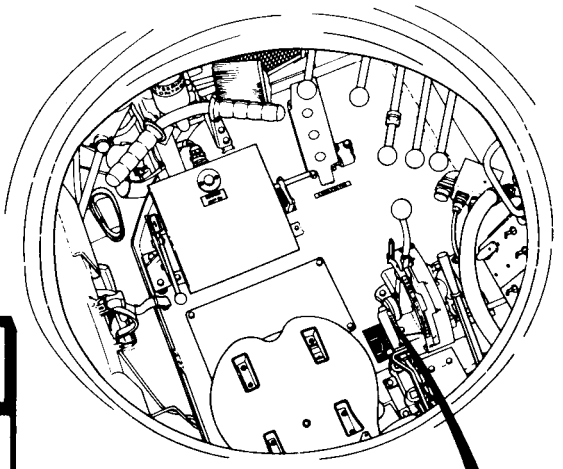
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING

Symptom-9

BOTH INTAKE MANIFOLD PREHEATERS WILL NOT WORK

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



OPERATOR'S STATION

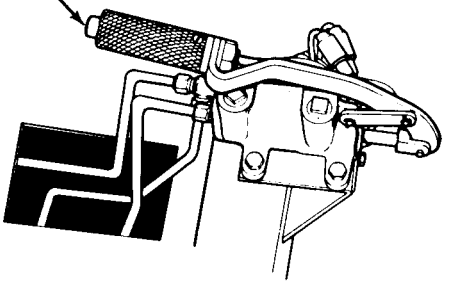
1 Check primer pump for back pressure.

First Technician (Operator's Station)

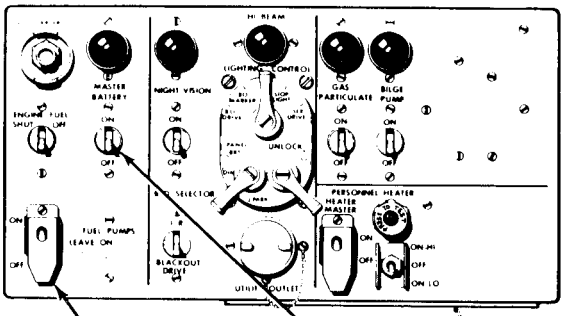
- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.
- Operate primer pump several times.

Does primer pump build up normal back pressure?

PRIMER PUMP



MASTER CONTROL PANEL



FUEL PUMPS SWITCH

MASTER BATTERY SWITCH

YES

NO

2 See Symptom 7: PRIMER PUMP WILL NOT WORK.

TA250107

Symptom-9 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

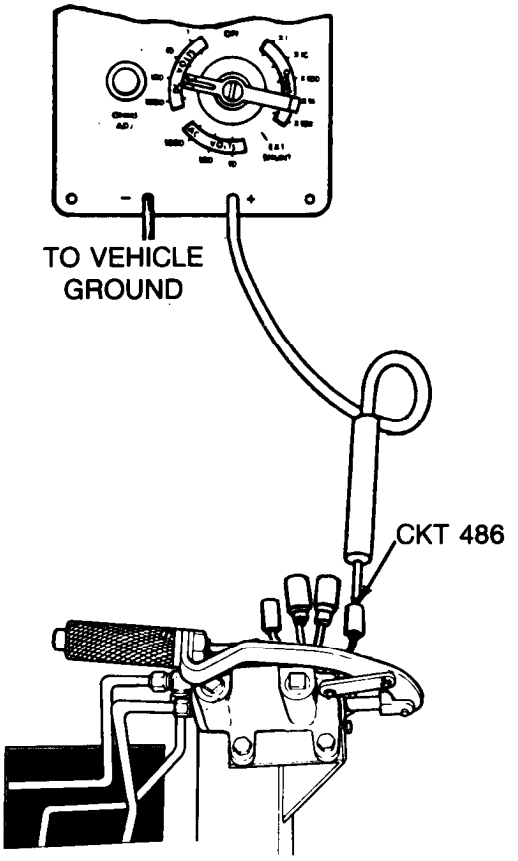
CAUTION

Do not press STARTER button for more than 14 seconds.

3 **Check basket-control panel starting harness (CKT 486) at manifold preheat switch connector for electrical power.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Place manual fuel shutoff handle in OFF (out) position.
- Disconnect both harness connectors (CKT 486) from preheat switch at primer pump.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to one of the connectors (CKT 486) at manifold preheat switch and black probe to ground.
- Set MASTER BATTERY switch ON.
- Press STARTER button for about 10 seconds, then release.
- Check if meter indicates 10 to 30 volts dc.
- Repeat above check moving red probe of meter to other connector (CKT 486) at manifold preheat switch.
- Place manual fuel shutoff handle in ON (down) position.



Did meter indicate 18 to 30 volts dc at one of the connectors?

NO

YES

4

- **Check manifold preheat switch for continuity.**
- **See Step (12) .**

TA250108

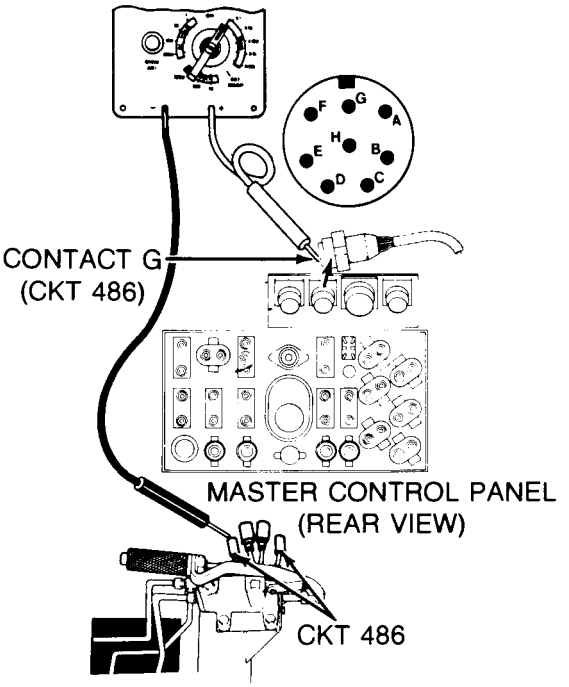
Symptom-9

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

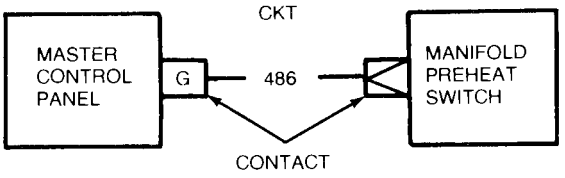
5 **Check basket-control panel starting harness (CKT 486) from master control panel to primer pump for continuity.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel starting harness connector from master control panel.
- Set mulitmeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact G (CKT 486) of basket-control panel starting harness connector at master control panel.
- Connect black probe of meter to first one (CKT 486) lead at primer pump and then to other lead.
- Check if meter indicates continuity at one of leads (CKT 486) at primer pump.



Did multimeter indicate continuity at one of the two (CKT 486) leads at the primer pump?



YES

NO

6

- **Inspect basket-control panel starting harness for bent/broken connector contacts or loose (CKT 486) wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-control panel starting harness.**
- **Connect basket-control panel starting harness connectors to primer pump and master control panel.**
- **Install master control panel (page 10-33).**

TA250109

Symptom-9

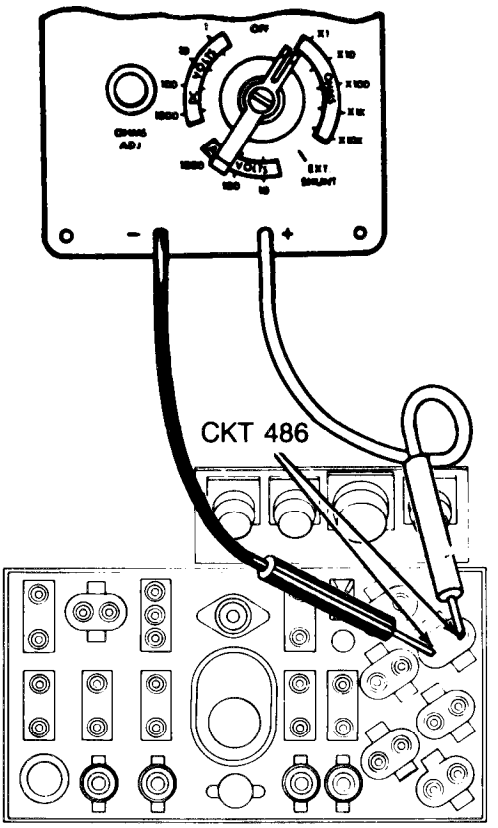
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

7 **Check manifold preheat circuit breaker (CKT 486) for continuity.**

First Technician (Operator's Station)

- Connect basket-control panel starting harness connectors to preheat switch at primer pump.
- Disconnect electrical lead connectors (CKT 486) from manifold preheat circuit breaker on master control panel.
- Connect red probe of meter to one circuit breaker contact and black probe to other circuit breaker contact.
- Check if meter indicates continuity.

Did meter indicate continuity?



YES

NO

8

- **Connect basket-control panel starting harness connector to master control panel.**
- **Replace manifold preheat circuit breaker (page 10-70).**

TA250110

Symptom-9

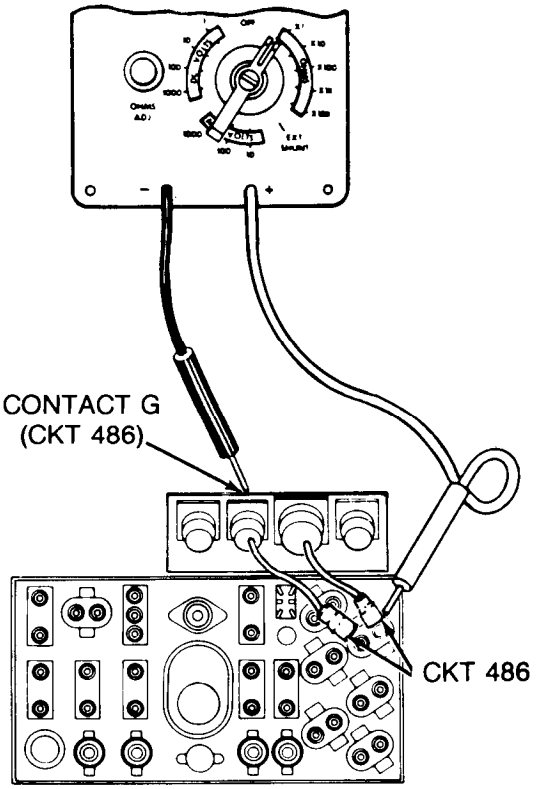
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

9 **Check control panel starting harness (CKT 486) from connector at control panel to connector at manifold pre-heat circuit breaker for continuity.**

First Technician (Operator's Station)

- Connect black probe of meter to contact G (CKT 486) of starting harness connector at master control panel.
- Connect red probe of meter to first one (CKT 486) lead at manifold preheat circuit breaker and then to other lead.
- Check if meter indicates continuity at one of leads (CKT 486) at manifold preheat circuit breaker.

Did meter indicate continuity at one of the two (CKT 486) leads at manifold preheat circuit breaker?



MASTER CONTROL PANEL
(REAR VIEW)

YES

10
- **Connect control panel starting harness connector to manifold preheat circuit breaker.**
- **Replace control panel accessories harness (page 10-91).**

NO

11
- **Connect control panel accessories harness connector to manifold preheat circuit breaker.**
- **Replace control panel starting harness (page 10-97).**

TA250111

Symptom-9

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

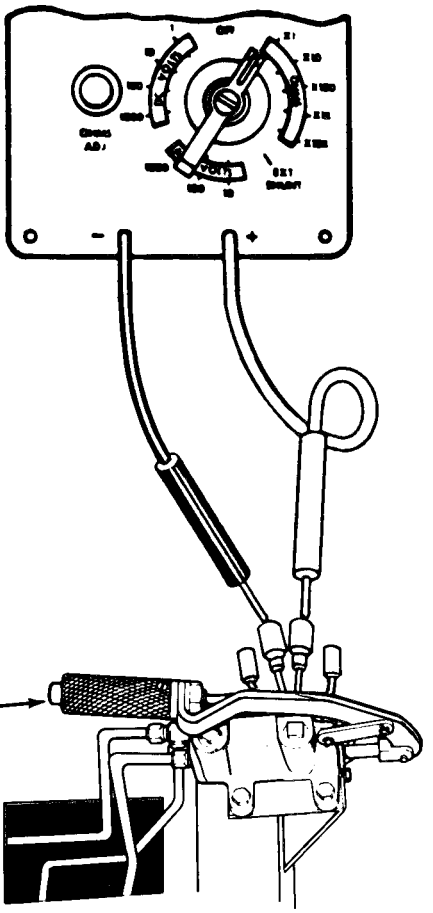
FROM STEP 4

12 Check manifold preheat switch for continuity.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to one manifold preheat switch connector and black probe to other manifold preheat switch connector.
- Press and hold manifold preheat switch.
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

NO

13 Replace primer pump (page 7-282).

TA250112

Symptom-9

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

CAUTION

Do not hold STARTER button and preheat switch ON for more than 14 seconds.

14 **Check bulkhead engine disconnect harness (CKT 486) at engine disconnect for electrical power.**

Second Technician (Top Deck)

- Open left top deck grille doors.
- Disconnect bulkhead engine disconnect harness connector from engine disconnect.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact A (CKT 486) of bulkhead engine disconnect harness connector at engine disconnect and black probe to ground.

First Technician (Operator's Station)

- Reconnect both basket-control panel starting harness connectors to preheat switch at primer pump.
- Set MASTER BATTERY switch ON.
- At the same time, press STARTER button and manifold preheat switch for about 10 seconds then release.

Second Technician (Top Deck)

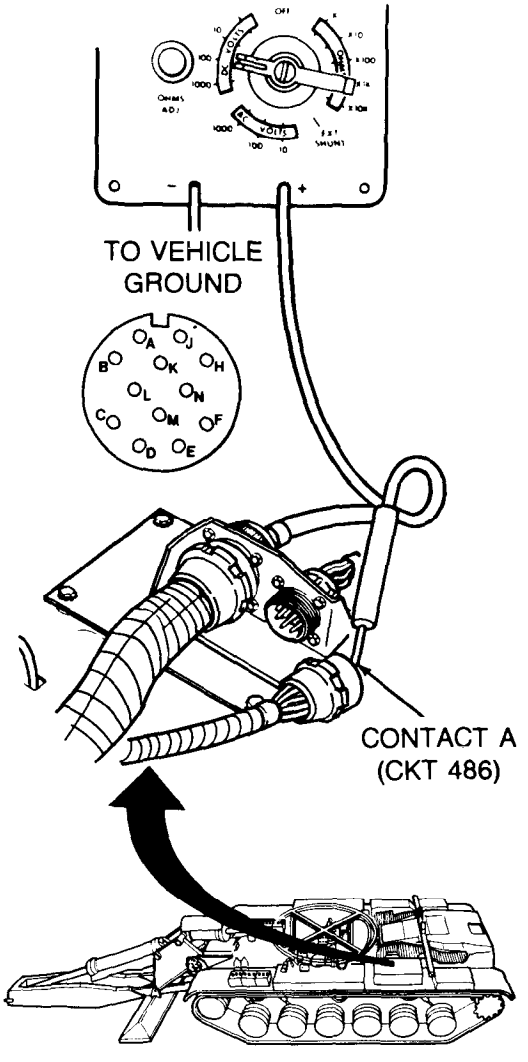
- Check if meter indicates 18 to 30 volts dc.

Did meter indicate 18 to 30 volts dc?

NO — YES

15

- **Check manifold heater fuel supply solenoid for operation.**
- **See Step (21) .**



TA250113

Symptom-9

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

16 **Check front accessory harness (CKT 486) at bulkhead disconnect for electrical power.**

First Technician (Operator's Station)

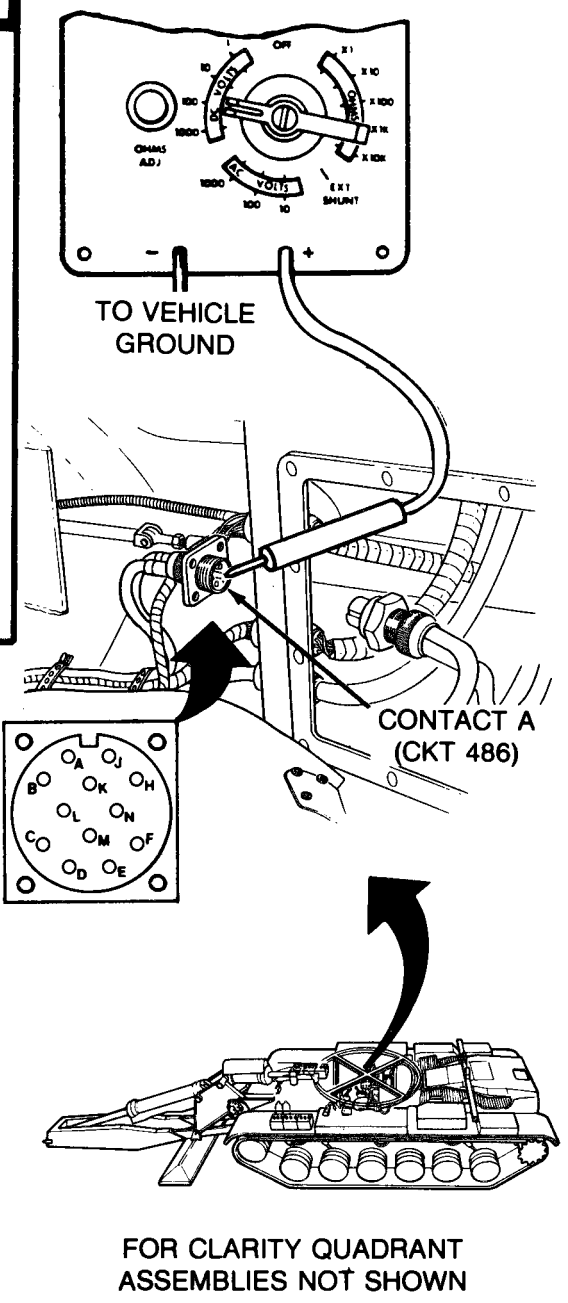
- Set MASTER BATTERY switch OFF.

Second Technician (Commander's Station)

- Displace front accessory harness connector at bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact A (CKT 486) of front accessory harness connector and black probe to ground.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- At the same time, press STARTER button and manifold preheat switch and hold for about 10 seconds, then release.



TA250114

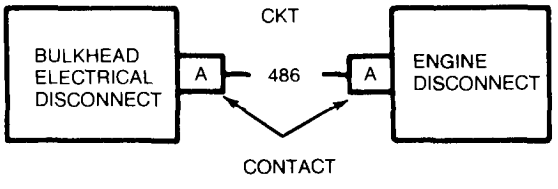
Symptom-9 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

STEP (16) CONTINUED

Second Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Did meter indicate 18 to 30 volts dc?



NO

YES

(17)

- **Inspect bulkhead engine disconnect harness for bent/broken connector contacts or loose CKT 486 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**
- **Connect bulkhead engine disconnect harness connector to engine disconnect.**
- **Close left top deck grille doors.**

TA250115

Symptom-9

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

18 **Check basket-control panel starting harness (CKT 486) from basket disconnect to preheat switch for continuity.**

First Technician (Operator's Station)

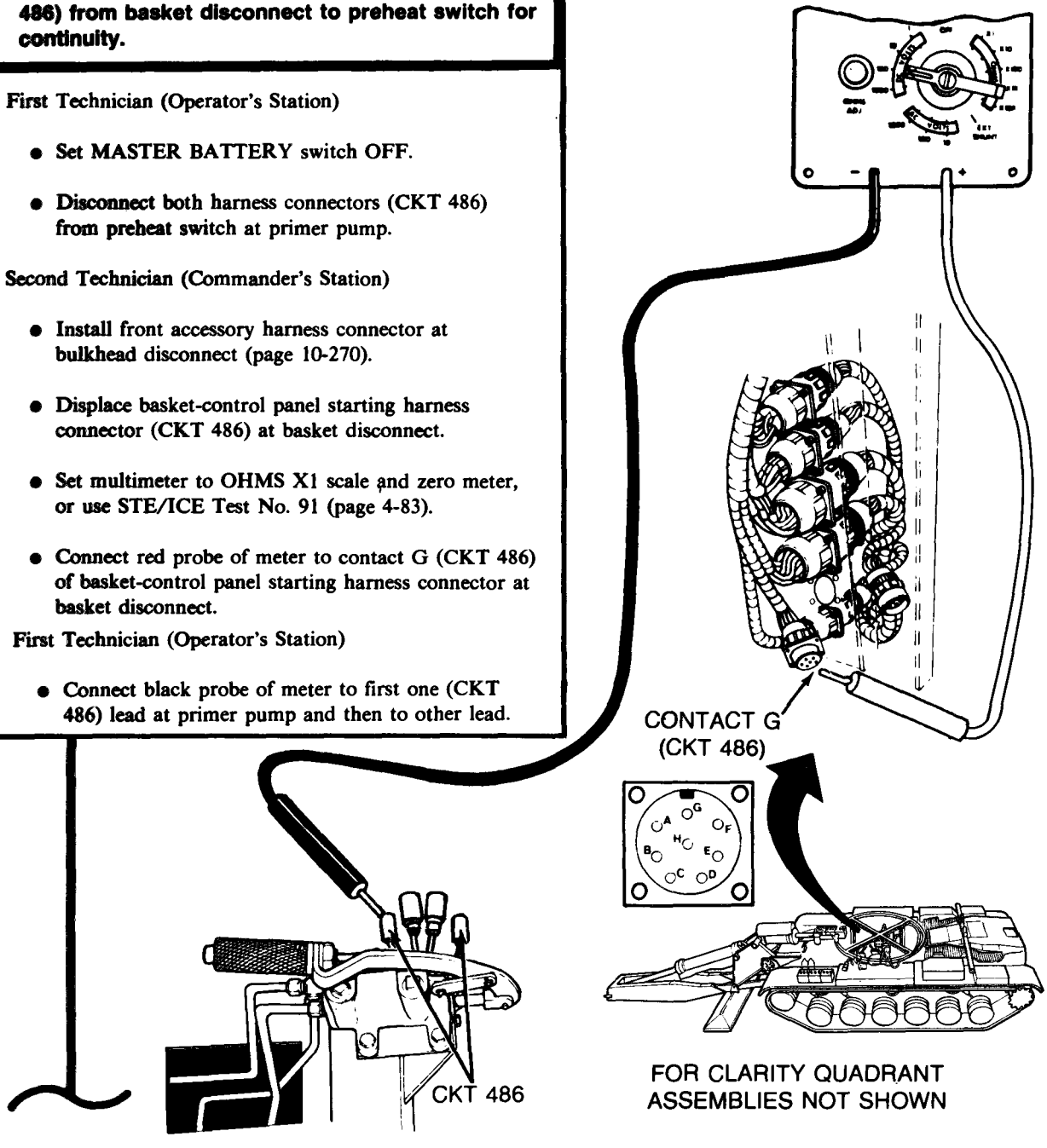
- Set MASTER BATTERY switch OFF.
- Disconnect both harness connectors (CKT 486) from preheat switch at primer pump.

Second Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).
- Displace basket-control panel starting harness connector (CKT 486) at basket disconnect.
- Set multimeter to OHMS X1 scale and zero meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact G (CKT 486) of basket-control panel starting harness connector at basket disconnect.

First Technician (Operator's Station)

- Connect black probe of meter to first one (CKT 486) lead at primer pump and then to other lead.



TA250116

Symptom-9 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

STEP (18) CONTINUED

Second Technician (Commander's Station)

- Check if meter indicates continuity at one lead at primer pump.

Did meter indicate continuity at one of the two (CKT 486) leads at the primer pump?

YES

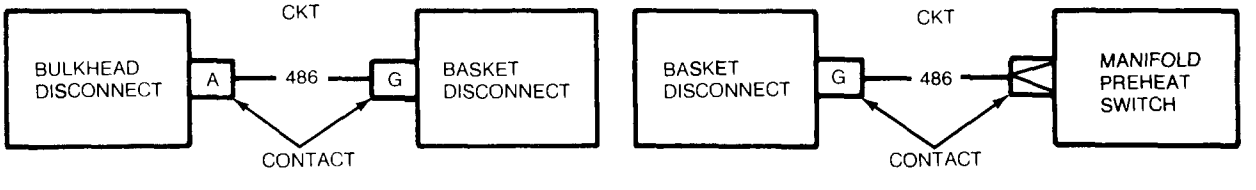
19

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 486 wires at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Install basket-control panel starting harness connector at basket disconnect.**
- **Connect basket-control panel starting harness connectors to preheat switch.**
- **Connect bulkhead engine disconnect harness connector at engine disconnect.**

NO

20

- **Inspect basket-control panel starting harness for bent/broken connector contacts or loose CKT 486 wires at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-control panel starting harness.**
- **Install basket-control panel starting harness connector at basket disconnect.**
- **Connect basket-control panel starting panel harness connectors to preheat switch.**
- **Connect bulkhead engine disconnect harness connector to engine disconnect.**



TA250117

Symptom-9 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FROM STEP (15)

(21) Check manifold heater fuel supply solenoid for operation.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Top Deck)

- Connect bulkhead engine disconnect harness connector at engine disconnect.
- Close left top deck grille doors.

Second Technician (Rear of Crew Compartment)

- Remove lower engine access panel (page 7-16).
- Listen for manifold heater fuel supply solenoid to click when first technician operates switches.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- At the same time press and release STARTER button and manifold preheat switch several times.
- Set MASTER BATTERY switch OFF.

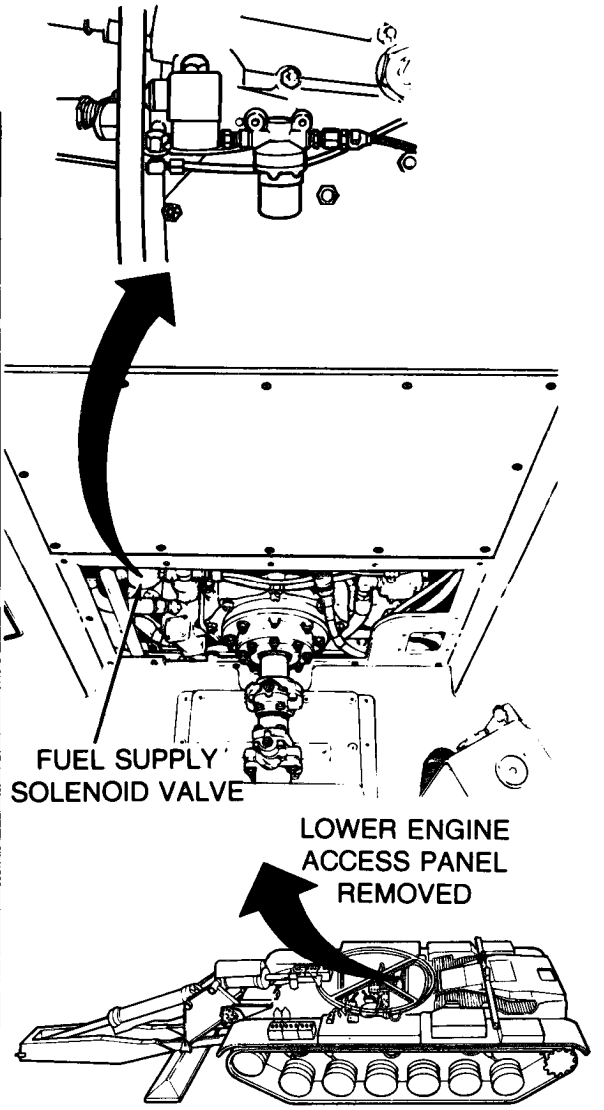
Did manifold heater fuel supply solenoid click when manifold preheat switch was pressed?

NO

YES

(22)

- **Check for free fuel flow at outlet of manifold heater solenoid valve.**
- **See Step (28) .**



TA250118

Symptom-9

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

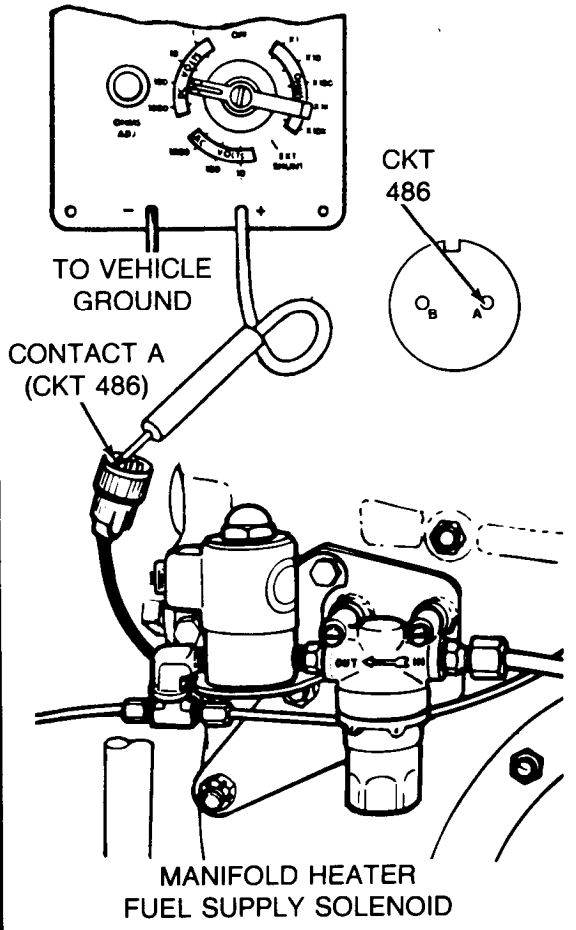
23 **Check engine electrical harness connector (CKT 486) at manifold heater fuel supply solenoid for electrical power.**

Second Technician (Rear of Crew Compartment)

- Disconnect engine electrical harness connector from manifold heater fuel supply solenoid connector.
- Connect red probe of meter to contact A (CKT 486) of engine electrical harness connector and black probe to ground.
- Observe meter for voltage indication when first technician operates switches.

First Technician (Operator's Station)

- Place manual fuel shutoff in the OFF (out) position.
- Set MASTER BATTERY switch ON.
- At the same time, press STARTER button and manifold preheat switch for about 10 seconds, then release.
- Place manual fuel shutoff switch in the ON (in) position.

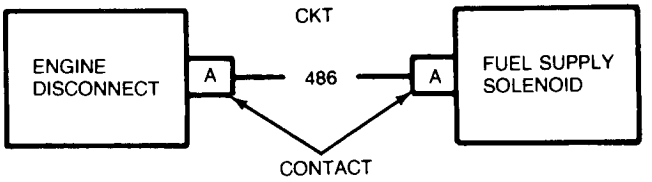


Does meter indicate 18 to 30 volts dc?

YES

NO

24 **Repair engine electrical harness (CKT 486) (page 10-298).**



TA250119

Symptom-9

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

25 **Check engine electrical harness, at connector to manifold heater fuel supply solenoid, for continuity from CKT GND to vehicle ground.**

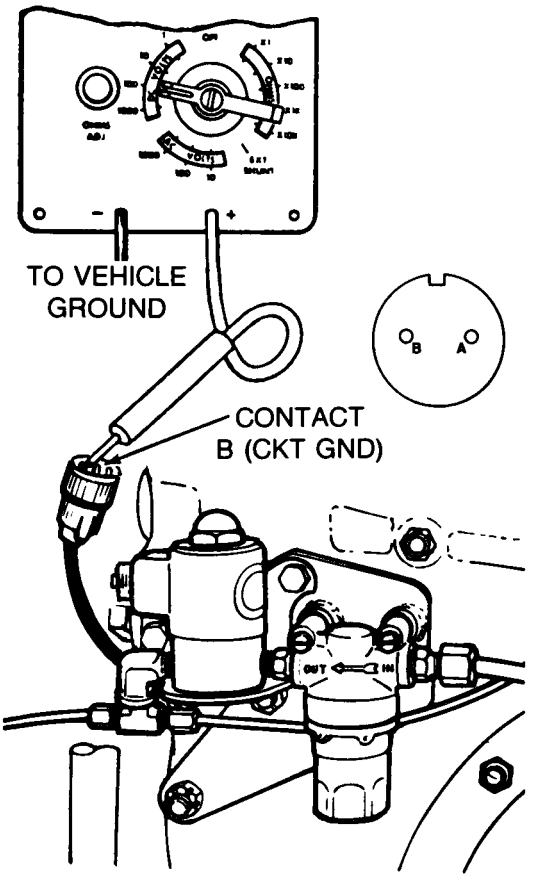
First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Rear of Crew Compartment)

- Set multimeter to OHMS X1 scale and zero meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact B (CKT GND) of engine electrical harness connector at manifold heater fuel supply solenoid and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?

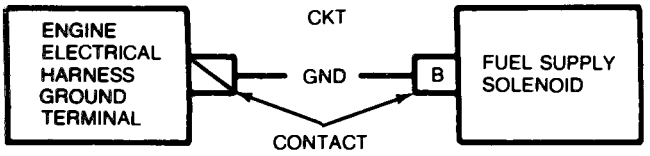


26 **Replace manifold heater fuel supply solenoid (page *1*-241).**

YES

27 **Repair engine electrical harness (CKT GND) (page 10-298).**

NO



TA250120

Symptom-9

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FROM STEP (22)

(28) Check for free fuel flow at outlet of manifold heater solenoid valve.

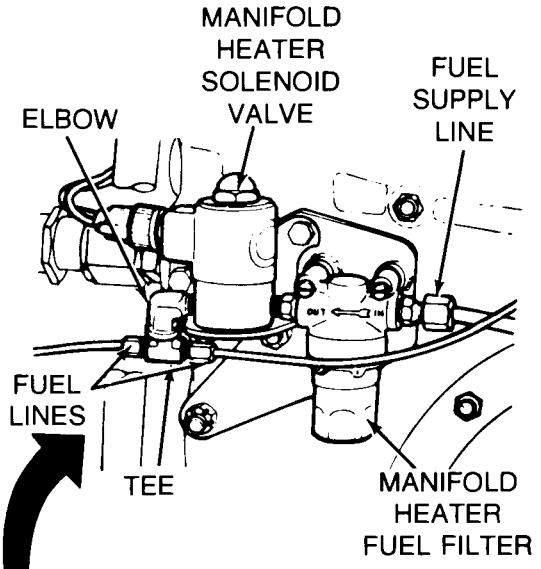
Second Technician (Rear of Crew Compartment)

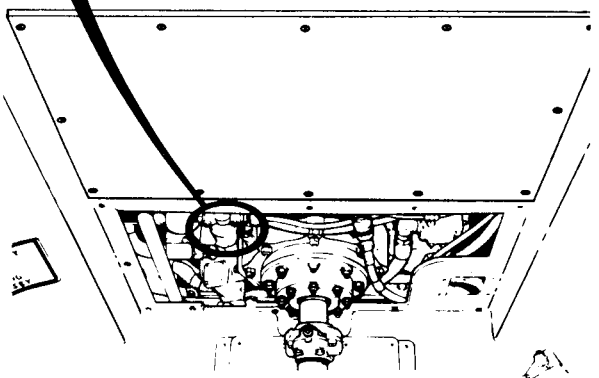
- Disconnect one of the fuel lines from tee at manifold heater solenoid valve outlet port.
- Place a container under tee to catch any fuel.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Operate primer pump while pressing STARTER and manifold preheat switches.
- Set MASTER BATTERY switch OFF.

Does fuel flow freely from outlet of manifold heater solenoid valve?





NO

YES

(29) Check manifold heater fuel return solenoid for operation.

See Step (35) .

TA250121

Symptom-9

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

30 **Check for free fuel flow at inlet to manifold heater fuel filter.**

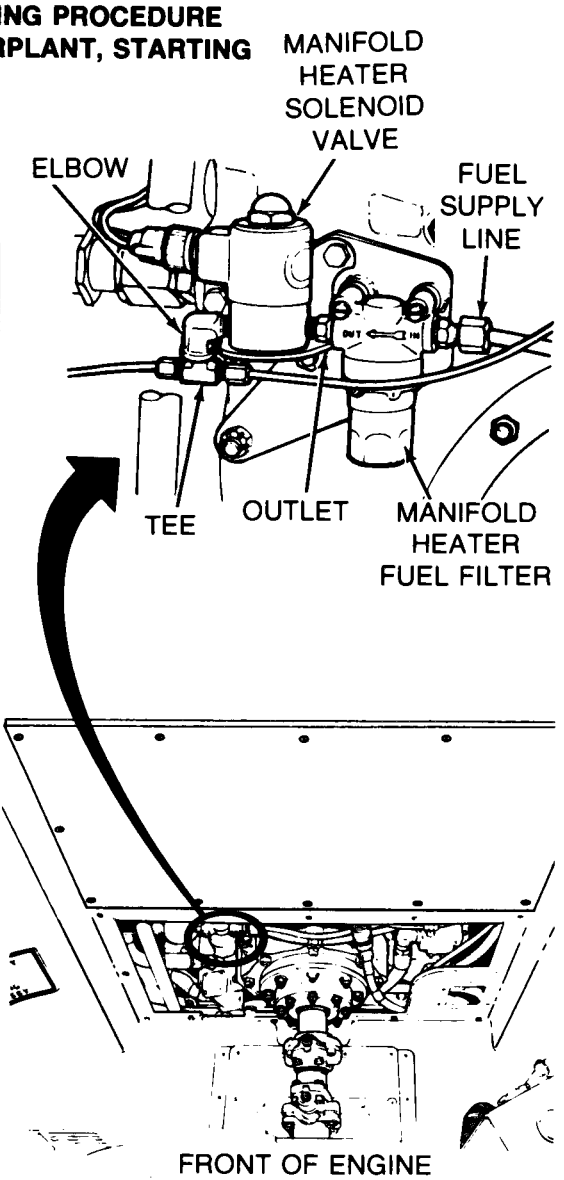
Second Technician (Rear of Crew Compartment)

- Connect fuel line to tee at manifold heater solenoid valve.
- Disconnect fuel supply line to manifold heater fuel filter.
- Place a container under fuel supply line to catch any fuel coming out.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Operate primer pump.
- Set MASTER BATTERY switch OFF.

Does fuel flow freely from disconnected line?



YES

NO

31

- **Clear clogged line between the backflow valve and fuel filter by blowing with compressed air. If this does not work, replace the line (page 7-256).**

TA250122

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

Symptom-9

32 **Check for free fuel flow at outlet of manifold heater fuel filter.**

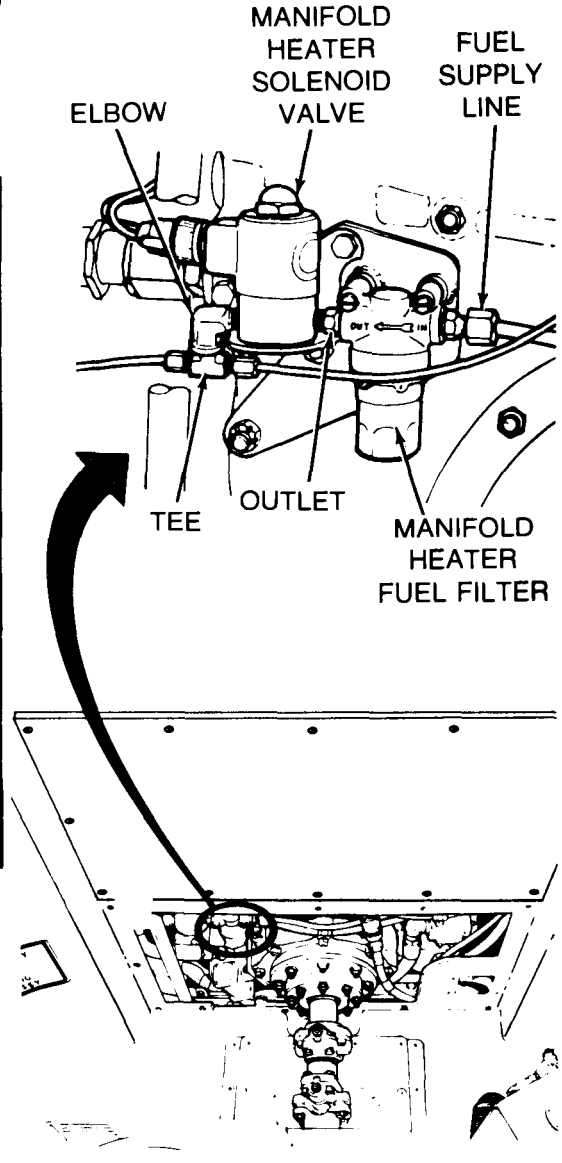
Second Technician (Rear of Crew Compartment)

- Connect fuel supply line to manifold heater fuel filter.
- Disconnect manifold heater solenoid valve from manifold heater fuel filter.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Operate primer pump.
- Set MASTER BATTERY switch OFF.

Does fuel flow freely at outlet of manifold heater fuel filter?



YES

33 **Replace manifold heater solenoid valve (page 7-270).**

NO

34 **Replace manifold heater fuel filter element (page 7-231).**

TA250123

Symptom-9
FROM STEP (29)

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

WARNING

After disconnecting ground straps, do not allow them to contact any metal surface.

(35) Check manifold heater fuel return solenoid for operation.

First Technician (Front of Crew Compartment)

- Disconnect three battery ground straps (page 10-268).

Second Technician (Commander's Station)

- Connect fuel line to tee at manifold heater solenoid valve.
- Displace battery slave cable connector from starter feed harness connector at bulkhead disconnect (page 10-298).

First Technician (Front of Crew Compartment)

- Connect three battery ground staps (page 10-268).

Both Technicians (Rear Grille Doors)

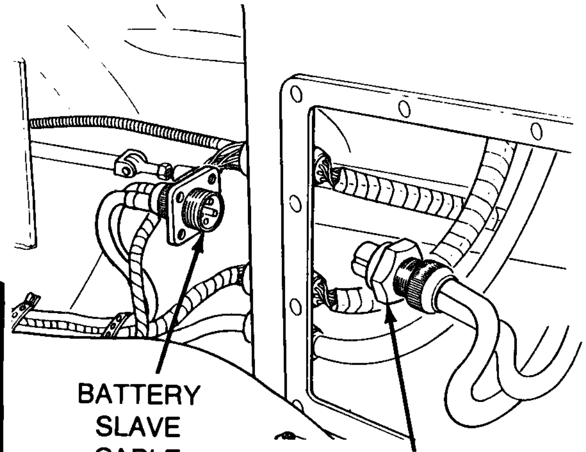
- Remove transmission shroud (page 9-2).

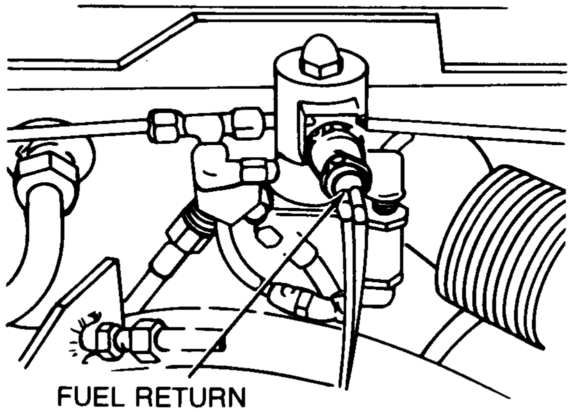
First Technician (Operator's Station)

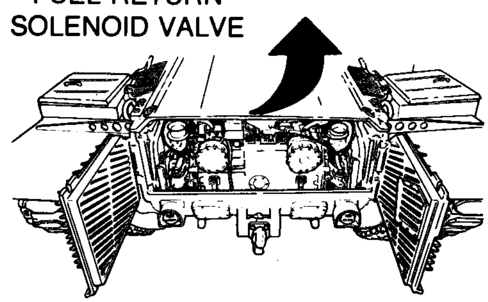
- Set MASTER BATTERY switch ON.
- At the same time press STARTER button, and press manifold preheat switch several times, then release.

Second Technician (Rear Grille Doors)

- Listen for manifold heater fuel return solenoid to click when preheat switch is pressed.







Does manifold heater fuel return solenoid click?

NO — YES

(36)
- **Check for electrical power at manifold heater spark plug connectors.**

- **See Step (47) .**

TA250124

Symptom-9

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

37 **Check transmission harness connector (CKT 486) at manifold heater fuel return solenoid for electrical power.**

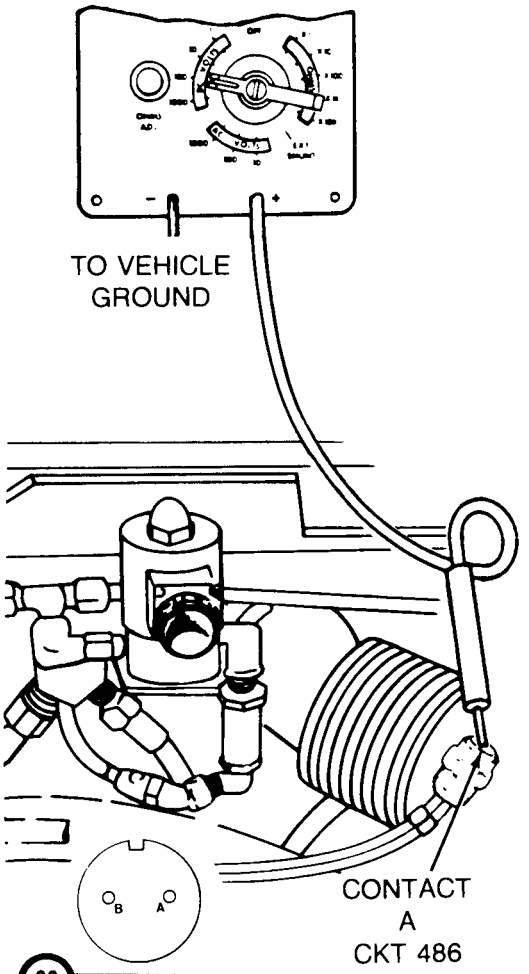
Second Technician (Rear Grille Doors)

- Disconnect transmission harness connector from manifold heater fuel return solenoid connector.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact A (CKT 486) of transmission harness connector at manifold fuel return solenoid and black probe to ground.

First Technician (Operator's Station)

- At the same time press STARTER button and manifold preheat switch, then release.

Did meter indicate 18 to 30 volts dc?



YES

NO

38

- **Check transmission harness (CKT 486) for continuity from connector at transmission disconnect to connector at manifold heater fuel return solenoid.**

- **See Step (44) .**

TA250125

Symptom-9

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

39 **Check transmission harness, at connector to manifold heater fuel return solenoid, for continuity from CKT GND to vehicle ground.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

WARNING

After disconnecting ground straps, do not allow them to contact any metal surface.

First Technician (Front of Crew Compartment)

- Disconnect three battery ground straps (page 10-268).

Second Technician (Commander's Station)

- Install battery slave harness connector at bulkhead disconnect (page 10-270).

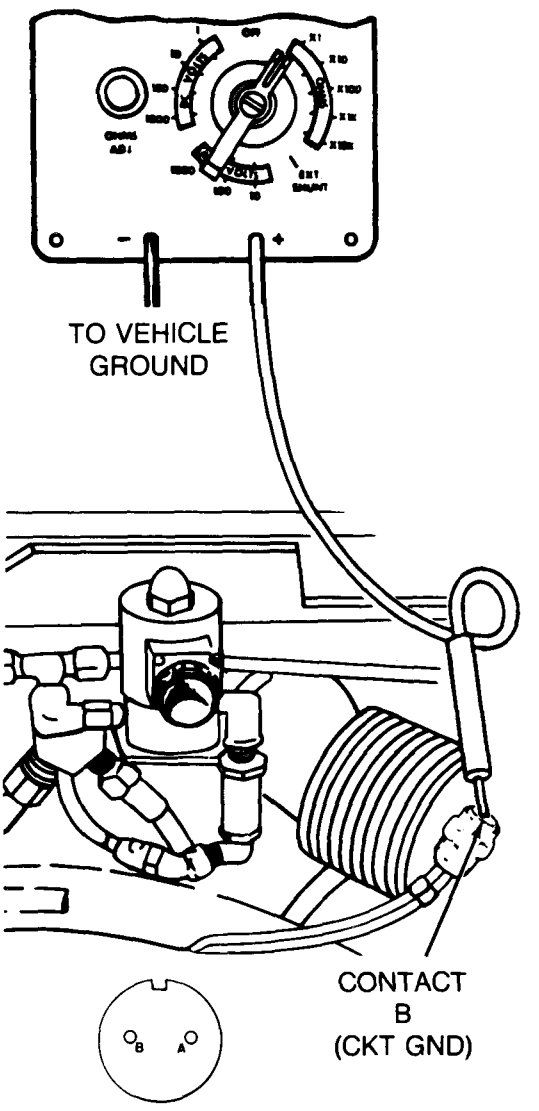
First Technician (Front of Crew Compartment)

- Connect three battery ground straps (page 10-268).

Second Technician (Rear Grille Doors)

- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact B (CKT GND) of transmission harness connector at manifold heater fuel return solenoid and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?



NO

YES

40 **Replace manifold heater fuel return solenoid (page 7-270).**

TA250126

Symptom-9

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

41 **Check engine electrical harness ground (CKT GND) circuit for continuity at transmission disconnect.**

Second Technician (Rear of Vehicle)

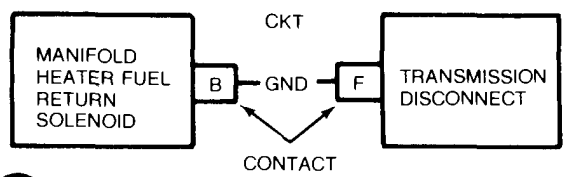
- Have powerplant removed (page 5-2).

Second Technician (Right Side of Engine)

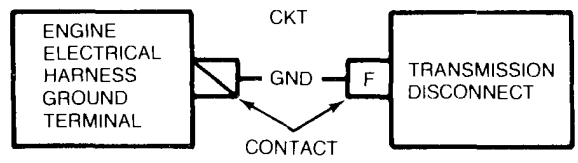
- Disconnect engine electrical harness connector from transmision harness connector at transmission disconnect.
- Connect red probe of meter to contact F (CKT GND) of transmission harness connector at transmission disconnect and black probe to ground.
- Check if meter indicates continuity.

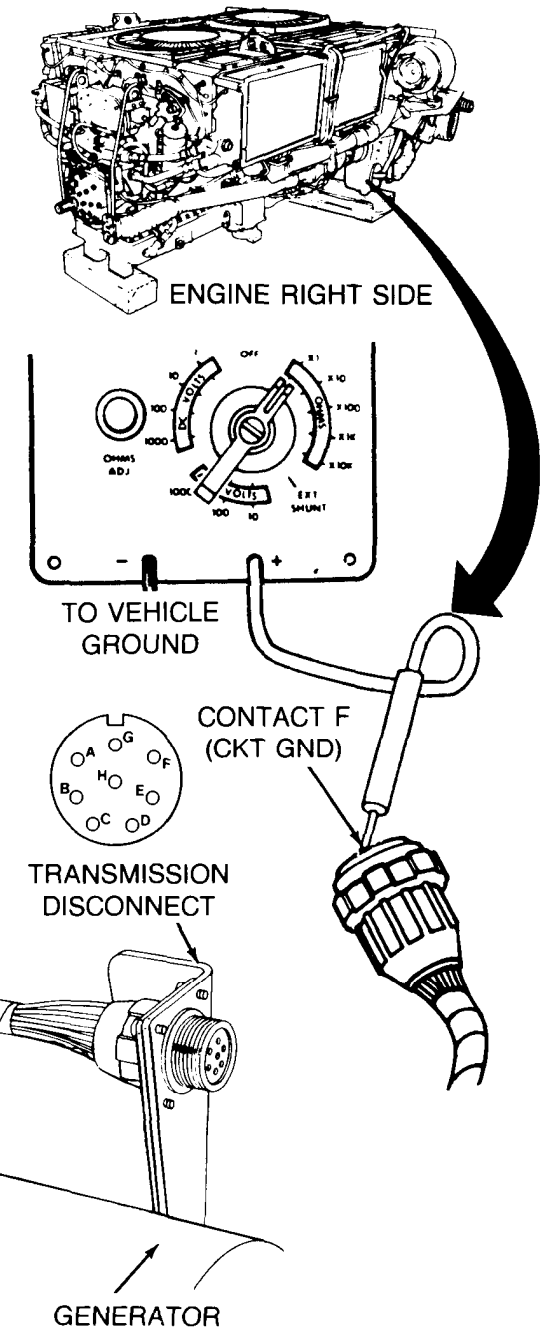
Does meter indicate continuity?

42 **Repair transmission harness (CKT GND) (page 7-276).** — YES



43 **Repair engine electrical harness (CKT GND) (page 7-276).** — NO





TA250127

Symptom-9

FROM STEP 38

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

44 **Check transmission harness (CKT 486) for continuity from connector at transmission disconnect to connector at manifold heater fuel return solenoid.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

WARNING

After disconnecting ground straps, do not allow them to contact any metal surface.

First Technician (Front of Crew Compartment)

- Disconnect 3 battery ground straps (page 10-268).

Second Technician (Commander's Station)

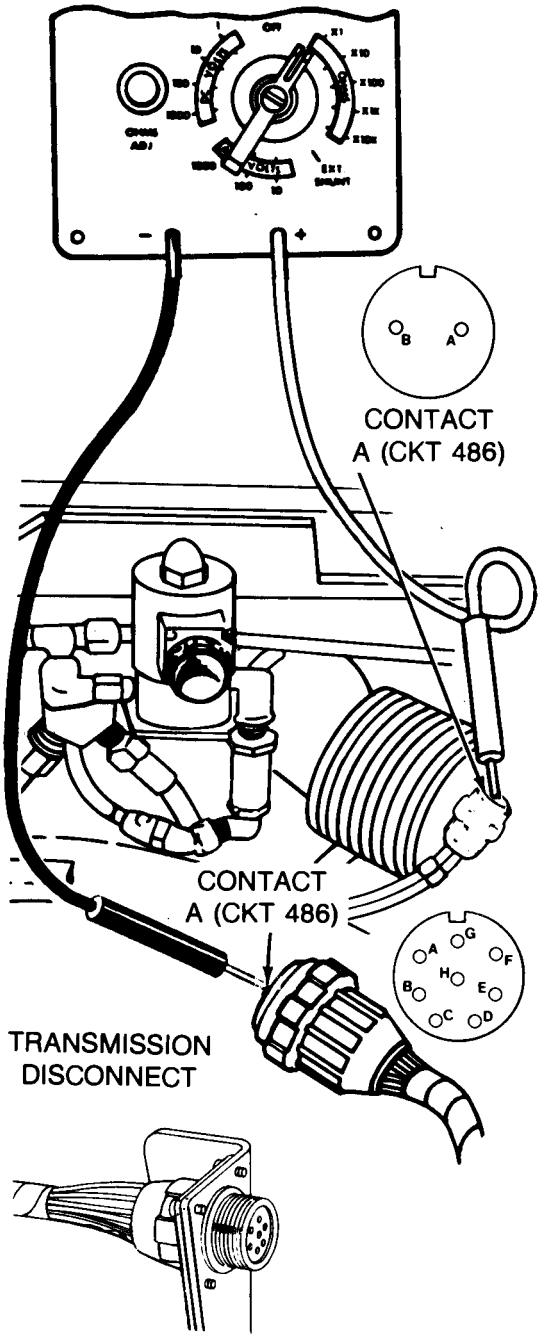
- Install battery slave cable connector at bulkhead disconnect (page 10-270).

Second Technician (Rear of Vehicle)

- Have powerplant removed (page 5-2).

Second Technician (Right Side of Engine)

- Disconnect engine electrical harness connector from transmission harness connector at transmission disconnect.



TA250128

Symptom-9

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

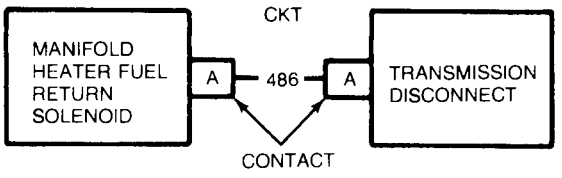
STEP (44) CONTINUED

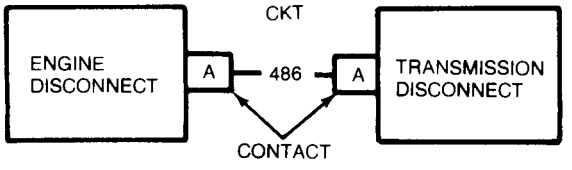
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact A (CKT 486) of transmission harness connector at manifold heater fuel return solenoid.
- Connect black probe of meter to contact A (CKT 486) of transmission harness connector at transmission disconnect.
- Check if meter indicates continuity.

Does multimeter indicate continuity?

NO → (45) **Repair transmission harness (CKT 486) (page 7-276).**

YES → (46) **Repair engine electrical harness CKT 486 (page 7-276).**





TA250129

Symptom-9

FROM STEP 36

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

WARNING

Stay clear of high voltage ignition wires. Contact with high voltage can cause injury or death.

WARNING

After disconnecting ground staps, do not allow them to contact any metal surface.

47 Check for electrical power at manifold heater spark plug connectors.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Front of Crew Compartment)

- Disconnect three battery ground straps (page 10-268).

Second Technician (Commander's Station)

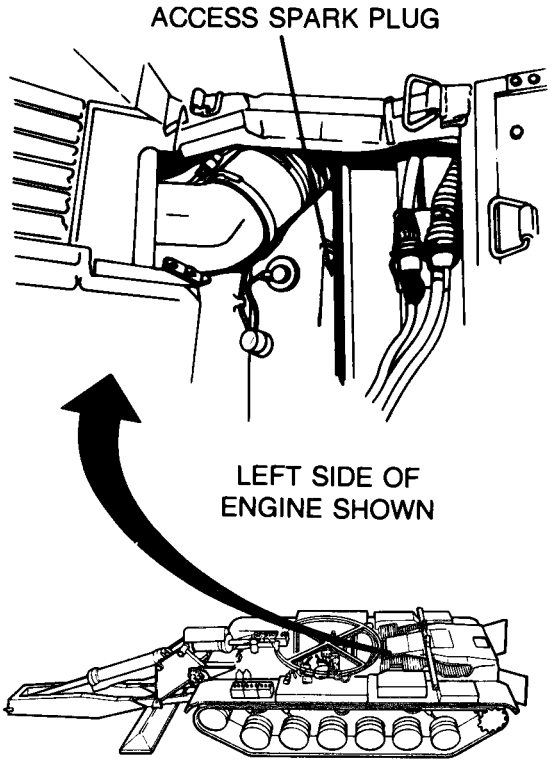
- Install battery slave cable connector at bulkhead disconnect (page 10-270).

First Technician (Front of Crew Compartment)

- Connect three battery ground straps (page 10-268).

Second Technician (Top Deck)

- Open left and right top deck grille doors.
- Disconnect right and left manifold heater spark plug ignition wires and lay loose ends 1/4 inch from vehicle ground.



TA250130

Symptom-9 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

STEP (47) CONTINUED

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- At the same time, press STARTER button and manifold preheat switch and hold for about 10 seconds, then release.

Second Technician (Top Deck)

- Check for arcing from ignition wires to ground when STARTER button and manifold preheat switch are pressed.

Did power arc to ground from high tension ignition leads?

YES

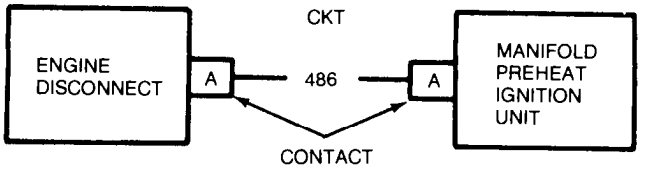
48

- **Connect left and right manifold heater ignition wires to spark plugs.**
- **Install engine lower access cover (page 7-14).**
- **See Symptom 2: ENGINE CRANKS AT NORMAL SPEED, BUT WILL NOT START (BATTERY/ GENERATOR GAGE SHOWS IN YELLOW AREA).**

NO

49

Repair engine electrical harness (CKT 486) (page 7-276).



TA250131

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING

Symptom-10

FUEL WATER SEPARATOR WILL NOT WORK.

NOTE

- To provide troubleshooting for malfunctions discovered during vehicle operation or fuel water separator operational check, this procedure is divided into three malfunctions as follows:
- If fuel water separator will not drain SEE STEP (1) .
- If fuel water separator will not stop draining SEE STEP (17) .
- If fuel water separator automatic drain exceeds 21 seconds and then stops replace control assembly (page 7-194).

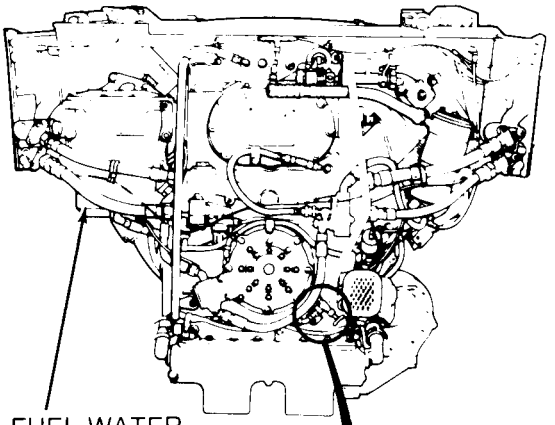
NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

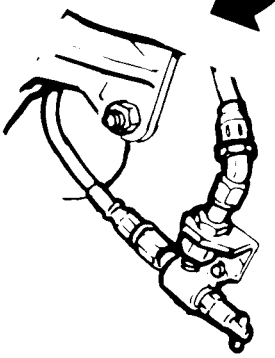
TA250132

Symptom-10

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)



FUEL WATER SEPARATOR



FUEL WATER SEPARATOR MANUAL DRAIN VALVE

1 Check for fuel flow from manual drain valve.

First Technician (Top Deck)

- Have powerplant removed (page 5-2).
- Install ground hop kit (page 5-25). Do not start engine.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.

First Technician (Front of Engine)

- Place suitable container under fuel water separator drain.
- Open fuel water separator manual drain valve.
- Check if fuel drains from water separator.
- Close fuel water separator manual drain valve.

Does fuel drain from manual fuel drain?

YES

NO

2 Disassemble fuel water separator manual drain lines and fittings. Clear clogged components with compressed air. If lines or fittings cannot be cleared of clogs, replace clogged components (page 7-202).

TA250133

Symptom-10

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

WARNING

Do not allow fuel to overflow container. Should container start to overflow disconnect ground hop fuel supply line.

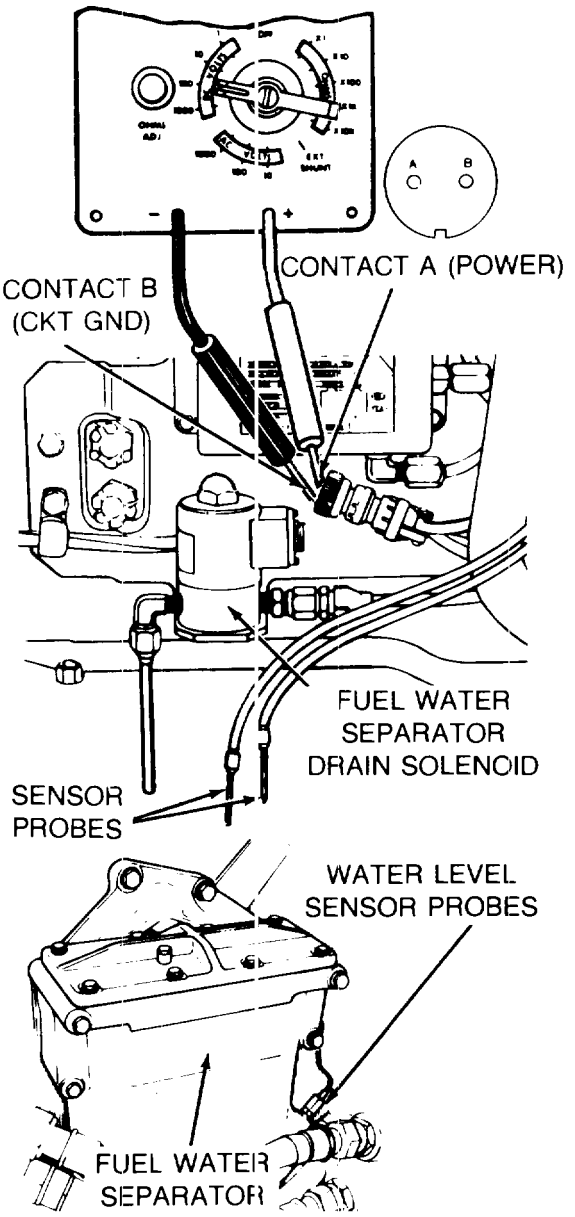
3 Check fuel water separator harness for electrical power at solenoid connector.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Front of Engine)

- Disconnect ground hop fuel supply line from engine.
- Remove two probes and adapters from fuel water separator (page 7-190).
- Install 1/8 inche pipe plugs in adapter openings.
- Place suitable container under drain line.
- Connect ground hop fuel supply line to engine.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Disconnect harness from fuel water separator drain solenoid.
- Connect red probe of meter to contact A and black probe to contact B of the harness connector.



TA250134

Symptom-10

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

STEP (3) CONTINUED

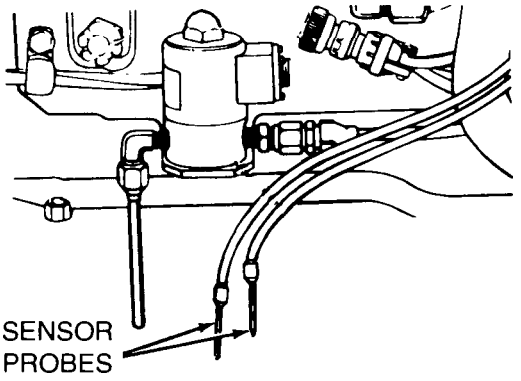
Second Technician (Operator's Station)

- Start engine,

First Technician (Front of Engine)

- Ground both fuel water separator probes against the engine case.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



NO

YES

(4)

- **Check for fuel flow to fuel water separator drain solenoid.**
- **See Step (12).**

TA250135

Symptom-10

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

5 **Check fuel water separator harness for continuity between solenoid connector contact A and control assembly connector contact A.**

Second Technician (Operator's Station)

- Stop engine.

First Technician (Front of Engine)

- Disconnect fuel water separator harness from control assembly.
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE test No. 91 (page 4-83).
- Connect red probe of meter to contact A of fuel water separator harness, control assembly connector.
- Connect black probe of meter to contact A of fuel water separator harness solenoid connector.
- Check if meter indicates continuity.

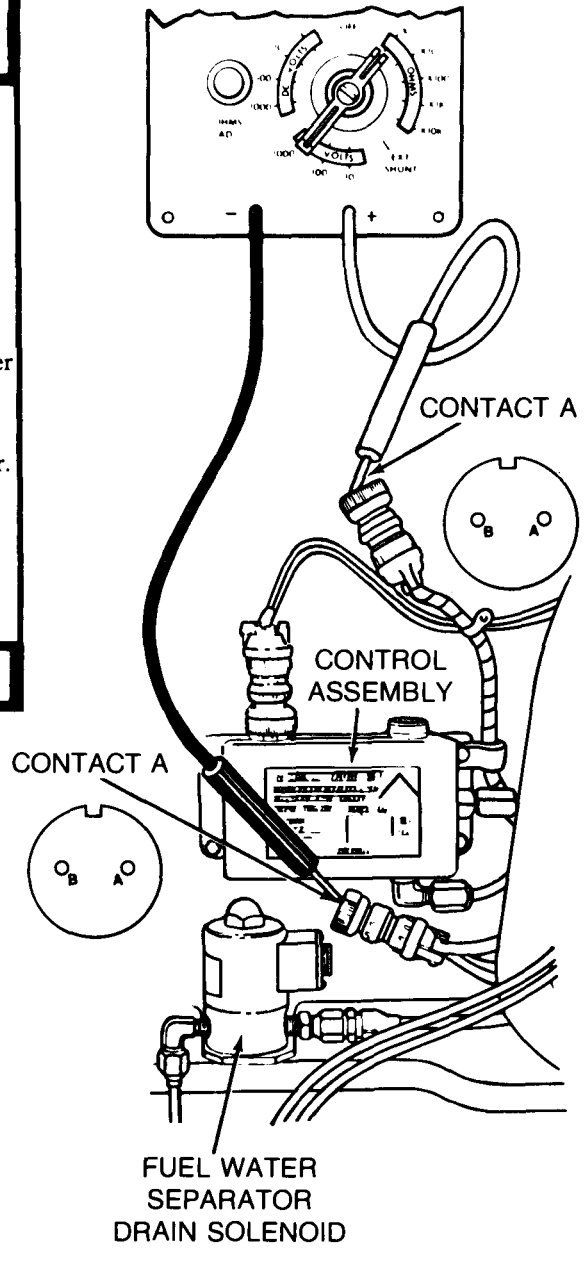
Does meter indicate continuity?

NO

6

- **Replace harness between control assembly and solenoid.**
- **Install probes in separator (page 7-192).**

YES



TA250136

Symptom 10

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

7 **Check fuel water separator harness for continuity between solenoid connector contact B and control assembly connector contact B.**

First Technician (Front of Engine)

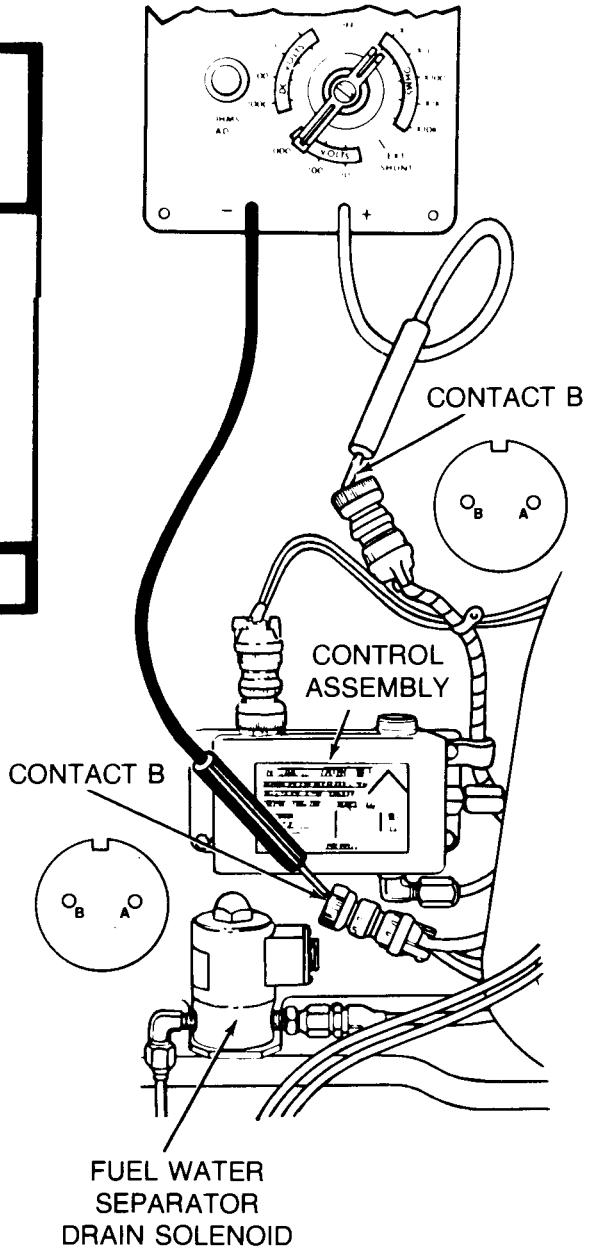
- Connect red probe of meter to contact B of fuel water separator harness, control assembly connector.
- Connect black probe of meter to contact B of fuel water separator harness, solenoid connector.
- Check if meter indicates continuity.

Does meter indicate continuity?

NO

8
- **Replace harness between control assembly and solenoid.**
- **Install probes in separator (page 7-192).**

YES



TA250137

Symptom-10

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

8.1 Check engine harness for electrical power at control assembly connector.

First Technician (Front of Engine)

- Connect fuel water separator harness to control assembly and solenoid.
- Disconnect engine electrical harness from control assembly.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact A and black probe to contact B of engine harness connector.

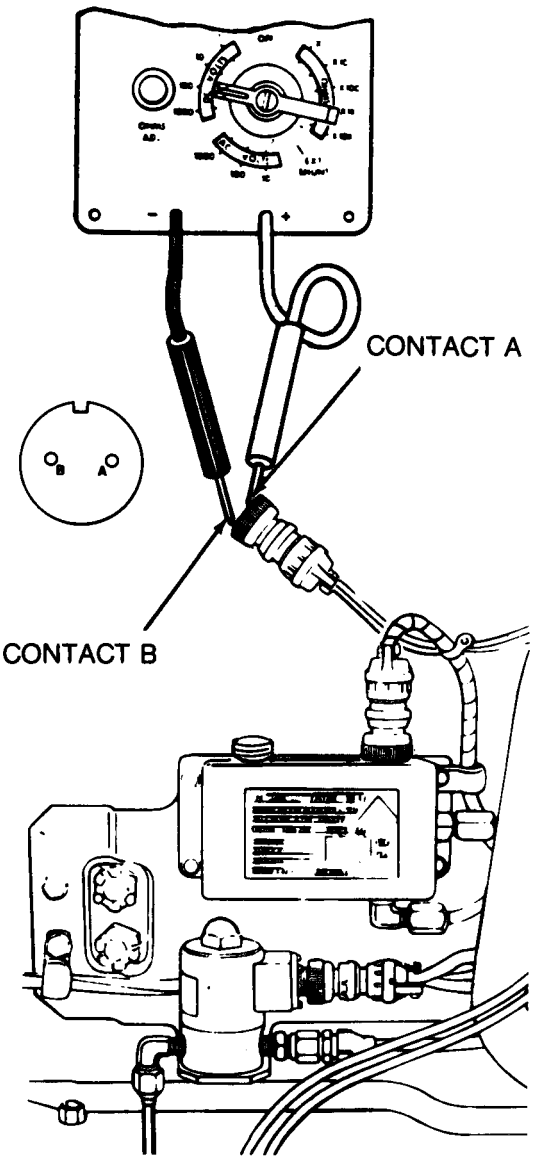
Second Technician (Operator's Station)

- Start engine.

First Technician (Front of Engine)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



NO

YES

8.2 Replace fuel water separator control assembly (page 7-194).

TA250138

Symptom-10

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

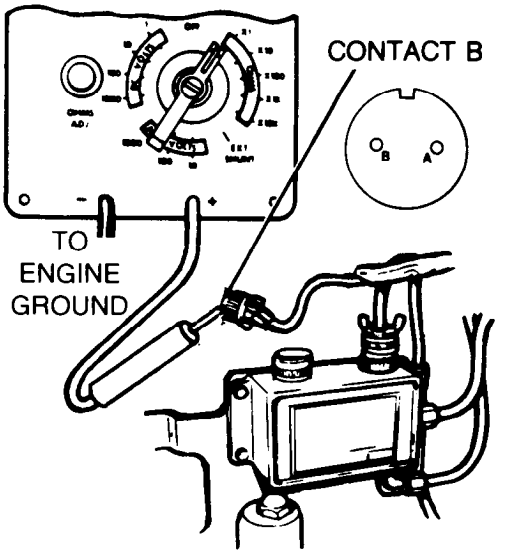
9 **Check engine electrical harness from connector at fuel water separator control to engine ground for continuity.**

Second Technician (Operator's Station)

- Stop engine.

First Technician (Front of Engine)

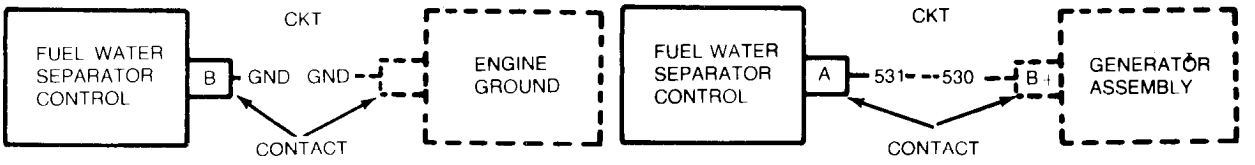
- Install probes in fuel water separator **(page 7-190).**
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 **(page 4-83).**
- Connect red probe of meter to contact B (CKT GND) of engine electrical harness connector at fuel water separator control and black probe to ground.
- Check if meter indicates continuity.



Does meter indicate continuity?

NO → **10** **Repair engine electrical harness CKT GND (page 10-276).**

YES → **11** **Repair engine electrical harness CKT 531 (page 10-276).**



TA250139

Symptom-10

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

FROM STEP 4

12 Check for fuel flow to fuel water separator drain solenoid.

Second Technician (Operator's Station)

- Stop engine.

First Technician (Front of Engine)

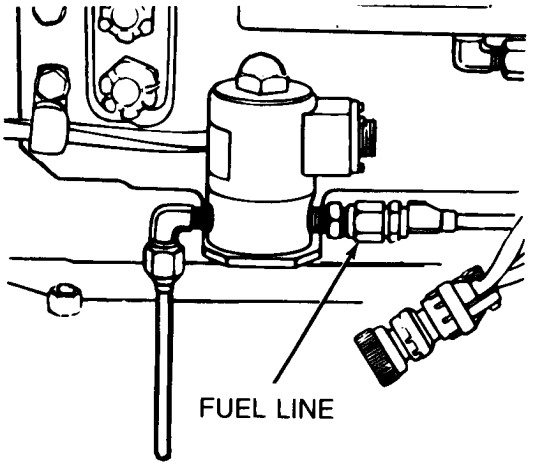
- Disconnect fuel line to fuel water separator drain solenoid.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON, for a few seconds, then OFF.

First Technician (Front of Engine)

- Check if fuel flows from disconnected line.



Does fuel flow from the disconnected line?

YES

NO

13

- **Remove clogs from line by blowing with compressed air. If line cannot be cleared, replace line (page 7-202).**
- **Connect electrical harness to drain solenoid.**

TA250140

Symptom-10

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

14 **Check drain line from fuel water separator solenoid for clogs.**

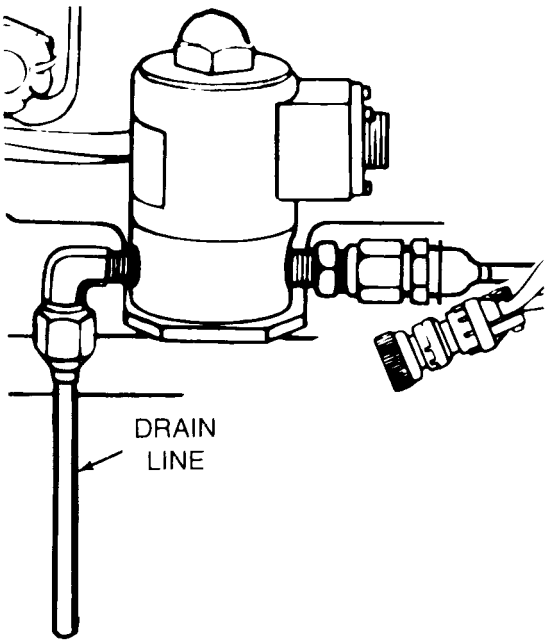
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Front of Engine)

- Remove drain line from fuel water separator drain solenoid.
- Using compressed air, blow through drain line.
- Check if air flows through drain line.

Does air flow through drain line?



NO

15

- **Replace drain line from fuel water separator solenoid (page 7-202).**
- **Connect electrical harness to drain solenoid.**

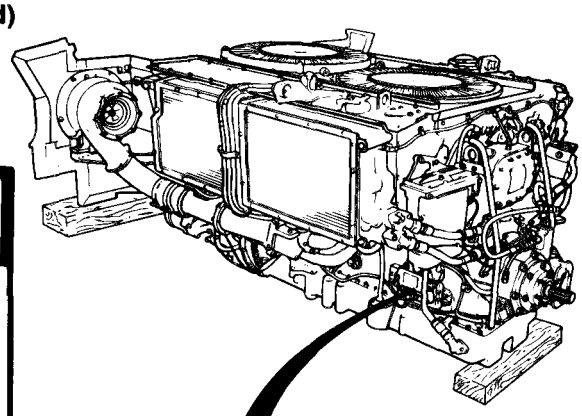
YES

16 **Replace fuel water separator drain solenoid (page 7-199).**

TA250141

Symptom-10

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)



17 **Check if fuel stops draining when wiring harness to solenoid is disconnected.**

First Technician (Top Deck)

- Have powerplant removed (page 5-2).
- Install ground hop kit (page 5-25). Do not start engine.

First Technician (Front of Engine)

- Disconnect harness from fuel water separator drain solenoid.

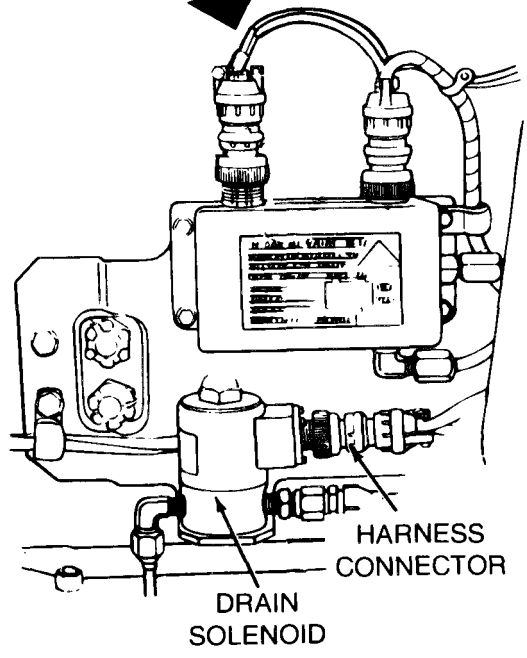
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.

First Technician (Front of Engine)

- Check if fuel flows from solenoid drain line.

Does fuel flow from solenoid drain line?



YES

18 **Replace fuel water separator drain solenoid (page 7-199).**

NO

19

- **Replace fuel water separator control assembly (page 7-194).**
- **Connect electrical harness to drain solenoid.**

TA250142

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING

Symptom-11

ENGINE WILL NOT RUN RIGHT.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

NOTE

- **If STE/ICE is available, perform Test No. 14: Compression Unbalance (page 4-86).**
- **If STE/ICE is not available, go to Step (1).**

(1) Check engine air intake and outlet hoses for damage.

Both Technicians (Top Deck)

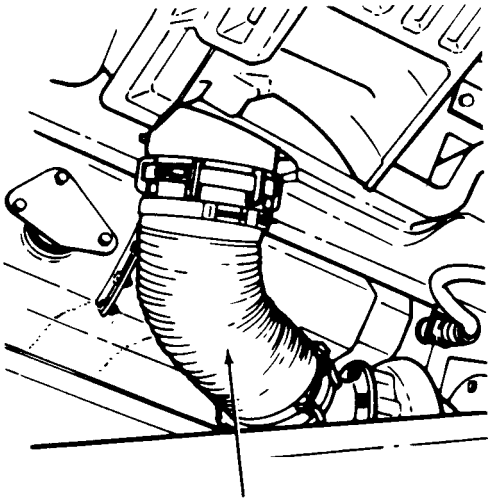
- Open top deck grille doors on both sides of vehicle.
- Check left and right side air intake hoses and outlet hoses for damage.

Are air intake or outlet hoses damaged?

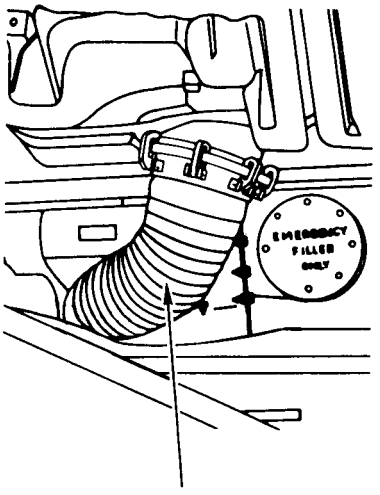
(2) Replace damaged intake (page 7-64). or outlet hoses (page 7-79).

YES

NO



AIR INTAKE HOSE
(RIGHT SIDE SHOWN)



AIR OUTLET HOSE
(LEFT SIDE SHOWN)

TA250143

Symptom-11

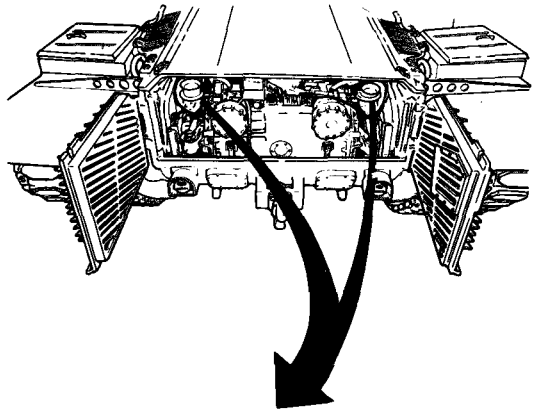
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

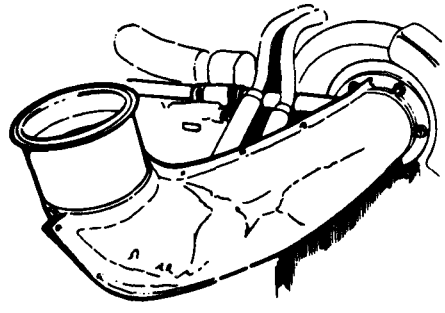
3 **Check right and left exhaust pipes for restrictions or damage.**

Both Technicians (Rear of Vehicle)

- Remove transmission shroud (page 9-2).
- Check right and left exhaust pipes for restriction or damage.

Are exhaust pipes restricted or damaged?





EXHAUST PIPE
(RIGHT SIDE SHOWN)

YES

4 **Remove restrictions. If restrictions cannot be removed, replace damaged exhaust pipes.**
Left side (page 8-5).
Right side (page 8-9).

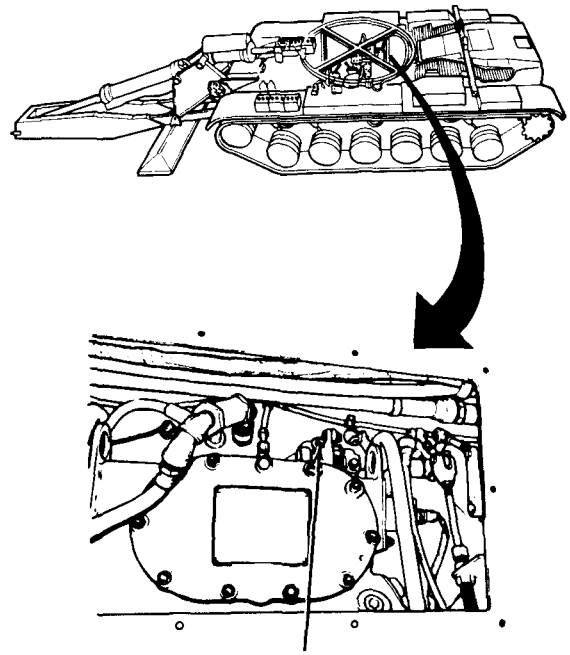
NO

TA250144

Symptom-11

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



ENGINE IDLE ADJUSTING SCREW

5 **Check engine idle adjustment.**

First Technician (Rear of Crew Compartment)

- Remove engine upper access panel (page 17-11).
- Check if engine idle screw is properly adjusted (page 7-313).

Is engine idle properly adjusted?

YES

NO

6 **Adjust engine idle (page 7-313).**

TA250145

Symptom-11

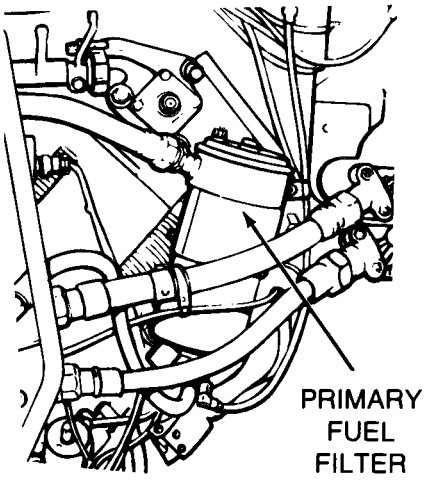
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

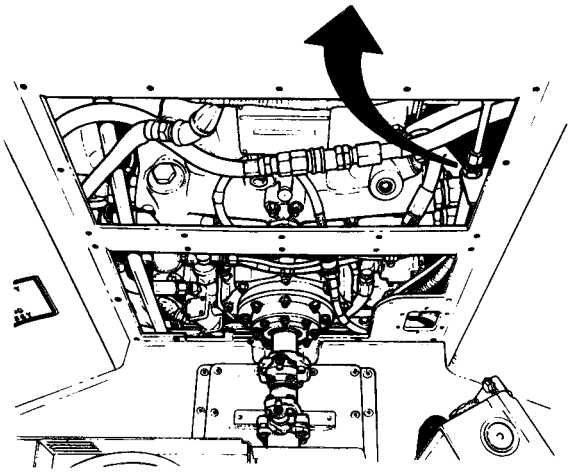
7 **Check primary fuel filter for contamination.**

First Technician (Rear of Crew Compartment)

- Remove primary fuel filter element and check filter element for contamination (page 7-187).

Is primary fuel filter contaminated?





NO

YES

8 **Service primary fuel filter (page 7-174).**

TA250146

Symptom-11

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

9 **Check if electric fuel pumps work.**

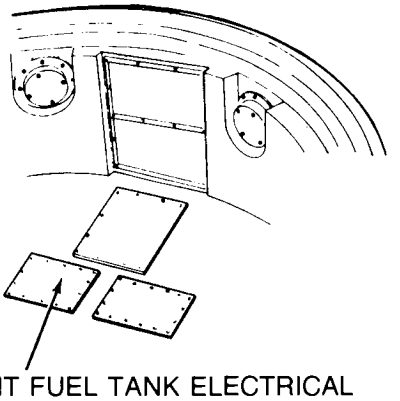
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.
- Listen for sound of right electric fuel pump running.

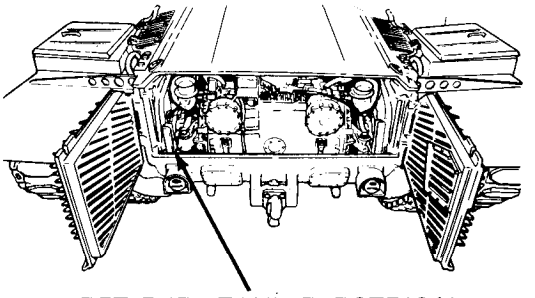
First Technician (Rear Grille Doors)

- Open rear grille doors.
- Listen for sound of left electric fuel pump running.

Do electric fuel pumps work?



RIGHT FUEL TANK ELECTRICAL FUEL PUMP ACCESS COVER



LEFT FUEL TANK ELECTRICAL FUEL PUMP

YES

NO

10 **See Symptom 5: ONE ELECTRIC FUEL PUMP WILL NOT WORK, or Symptom 6: BOTH ELECTRIC FUEL PUMPS WILL NOT WORK.**

TA250147

Symptom-11

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

NOTE

Step 11 locator views continued on page 4-265.

11 **Check fuel lines, backflow valve and filters for leaks or damage.**

Second Technician (Operator's Station)

- Set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.

Both Technicians (Outside Vehicle)

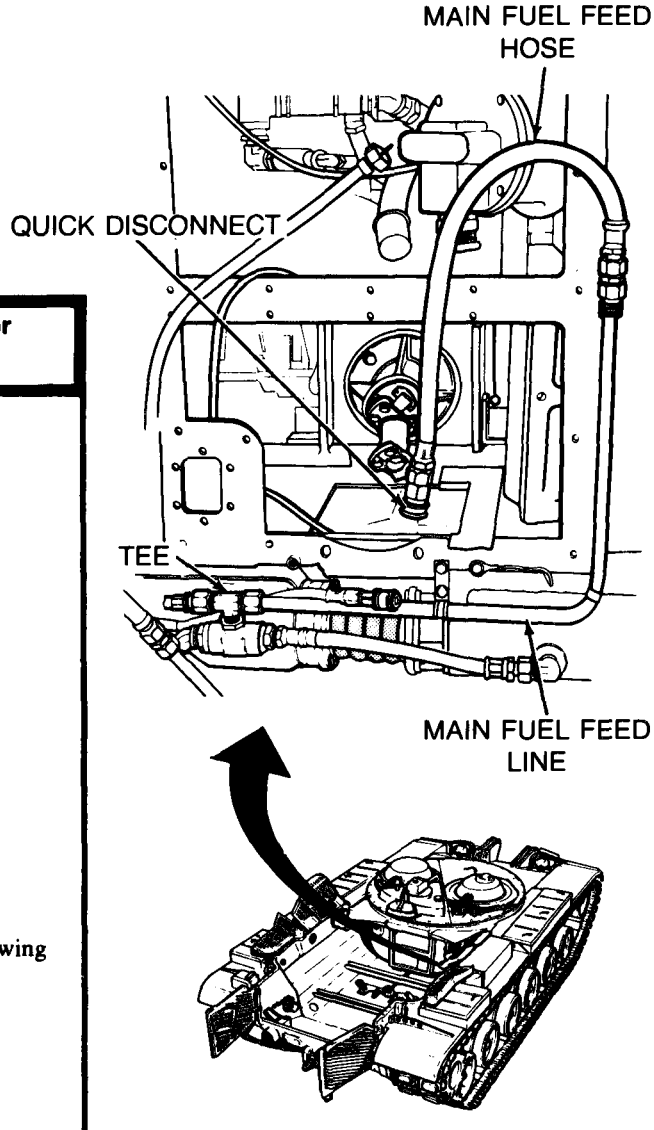
- Have powerplant removed (page 5-2).
- Install ground hop kit (page 5-25).

Second Technician (Operator's Station)

- Start engine.

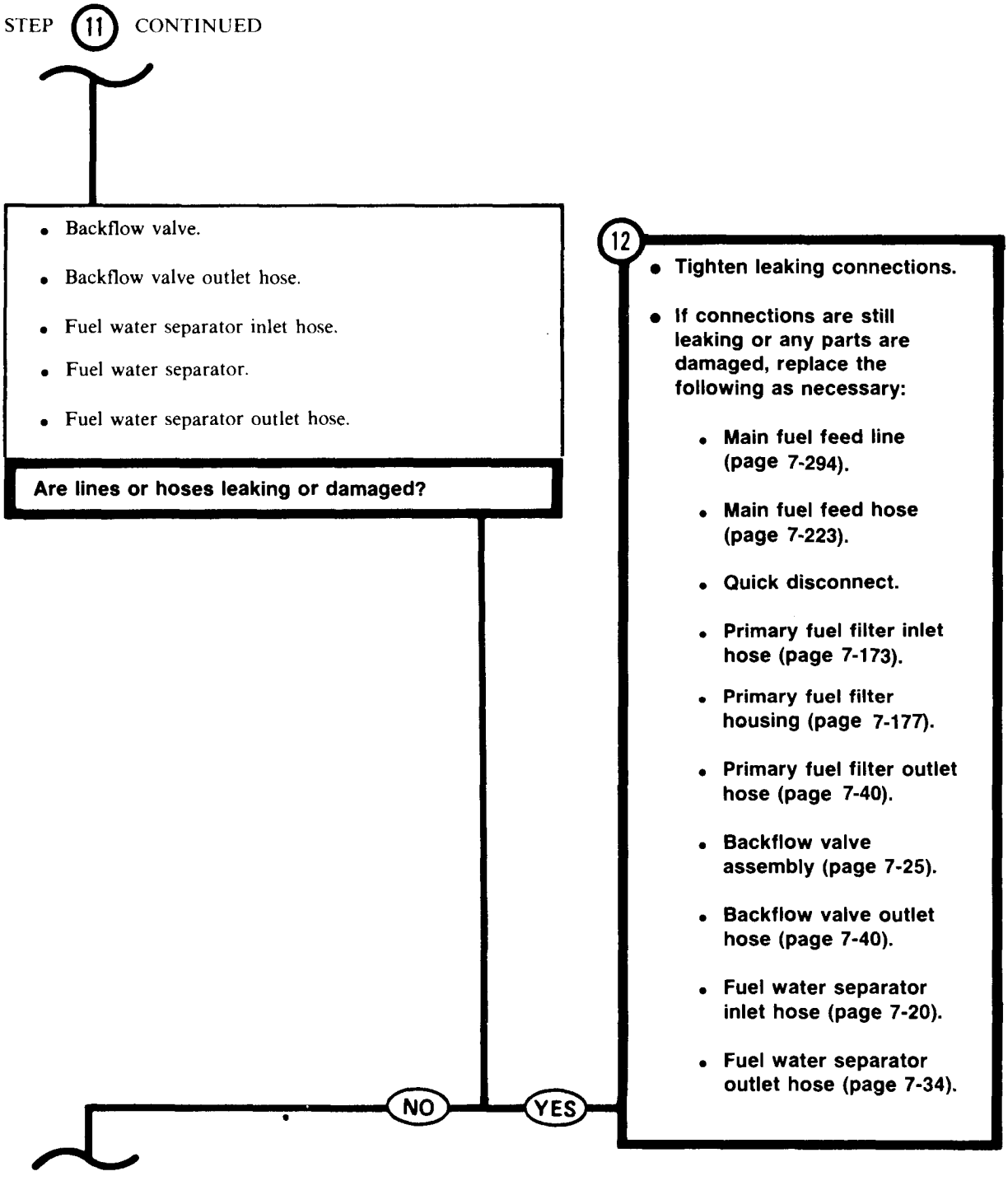
First Technician (Front of Engine)

- With the engine idling, visually check the following for leaks or damage:
  - Main fuel feed line.
  - Main fuel feed hose.
  - Quick disconnects.
  - Primary fuel filter inlet hose
  - Primary fuel filter housing.
  - Primary fuel filter outlet hose.



TA250148

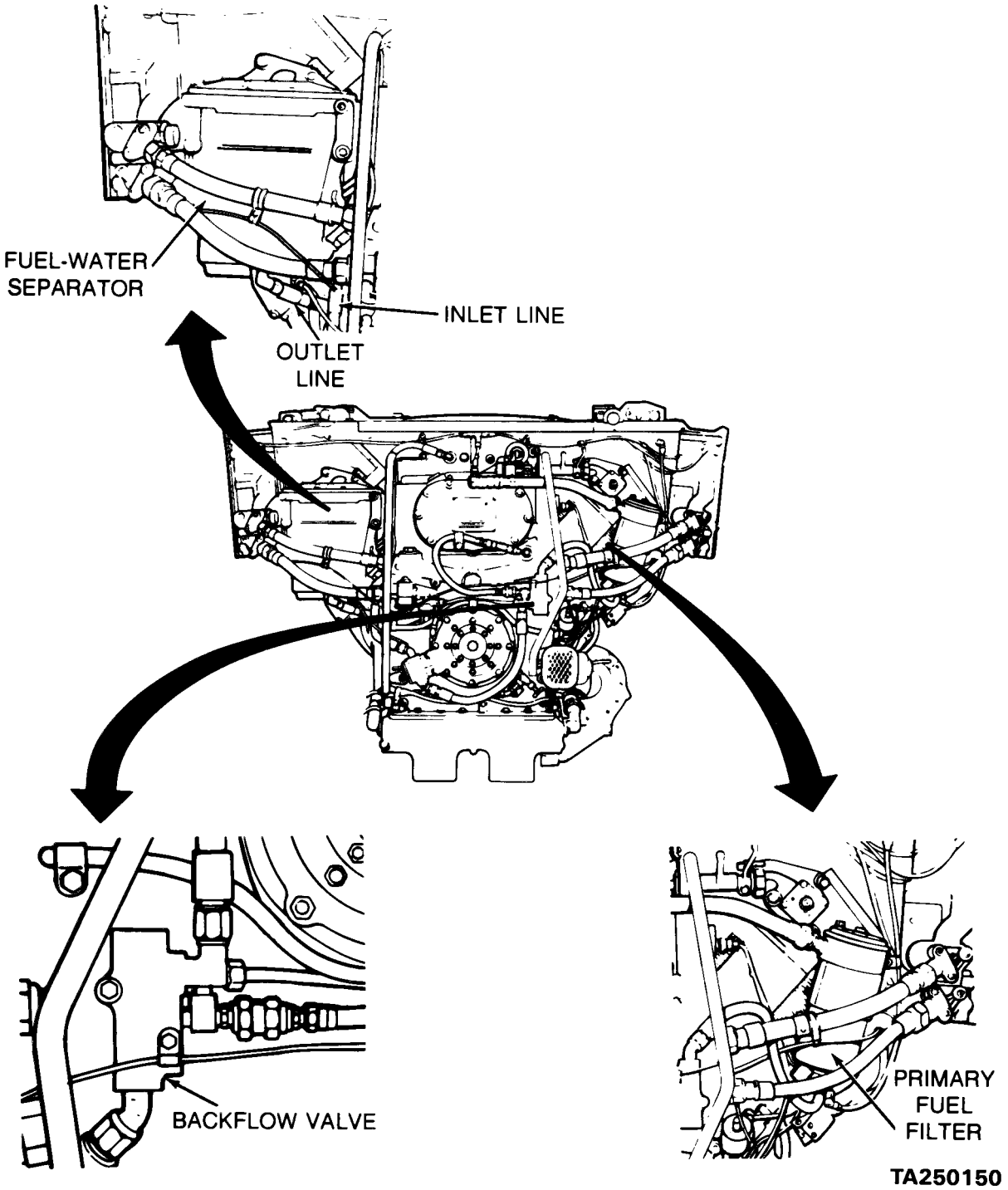
Symptom-11 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)



TA250149

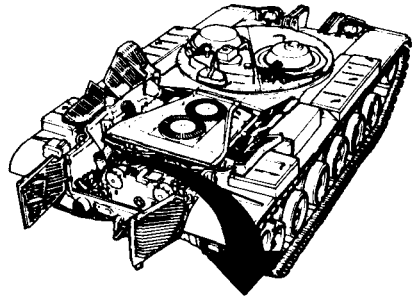
Symptom-11 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

Step 11 - Locator Views



TA250150

Symptom-11 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)



13 **Check low pressure fuel line assembly (fuel injector pump inlet to bulkhead elbow) for leaks or damage.**

Both Technicians (Top of Engine)

- Remove front cooling fan (page 9-55).

Second Technician (Operator's Station)

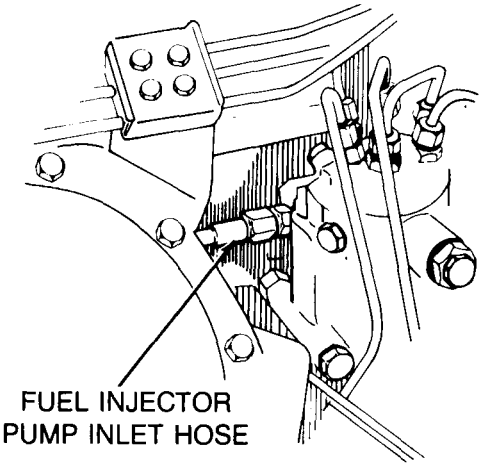
- Set FUEL PUMPS switch ON.
- Set MASTER BATTERY switch ON.

First Technician (Top of Engine)

- Check the fuel injector pump inlet line assembly for leaks, or damage.

Second Technician (Operator's Station)

- Set FUEL PUMPS switch OFF.



Is the fuel injector pump inlet line leaking or damaged?

NO

YES

14
- **Tighten loose connections**
- **Replace damaged fuel injector pump inlet line assembly (page 7-29).**

TA250151

Symptom-11

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

15 Check for fuel flow at inlet side of fuel injector pump.

First Technician (Top of Engine)

- Disconnect line at inlet side of fuel injector pump and place disconnected end in suitable container.

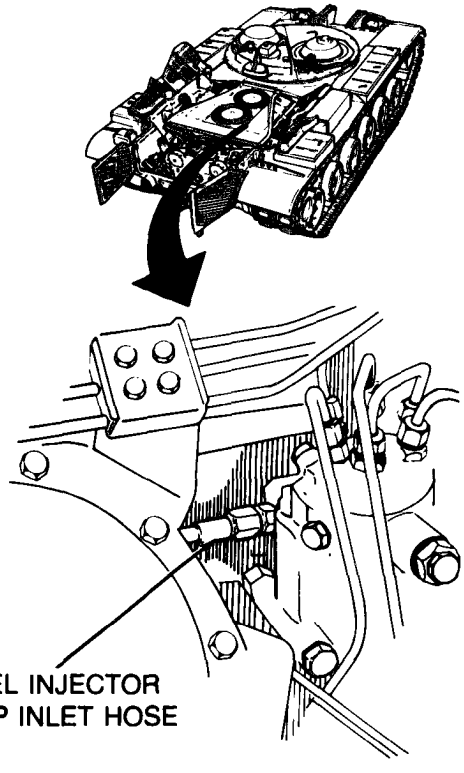
Second Technician (Operator's Station)

- Set FUEL PUMPS switch ON, for a few seconds, then OFF.

First Technician (Top of Engine)

- Check if fuel flows freely into container.

Does fuel flow freely?



NO

YES

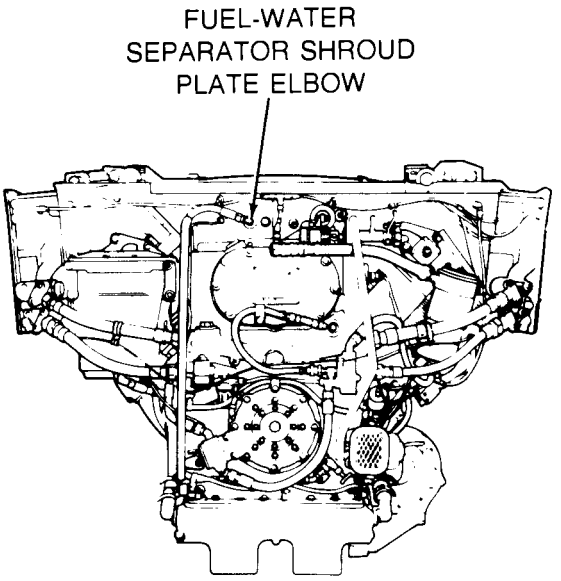
16

- **Notify support maintenance of engine problem.**
- **Connect fuel injector pump inlet line.**
- **Install cooling fan (page 9-55).**

TA250152

Symptom-11

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

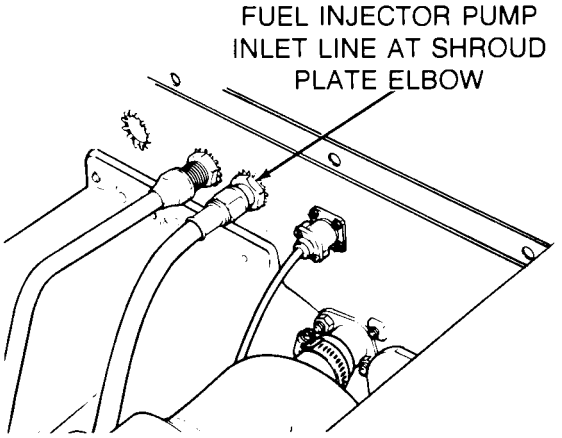


17 **Check fuel injector pump inlet hose for blockage.**

First Technician (Top of Engine)

- Disconnect fuel injector pump inlet line at the shroud plate elbow.
- Blow through hose with compressed air to check if line is blocked.

Is line blocked?



NO

YES

18 **Remove blockage. If blockage cannot be removed, replace fuel injector pump inlet line (page 7-29).**

TA250153

Symptom-11

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

19 **Check for fuel flow at shroud plate elbow.**

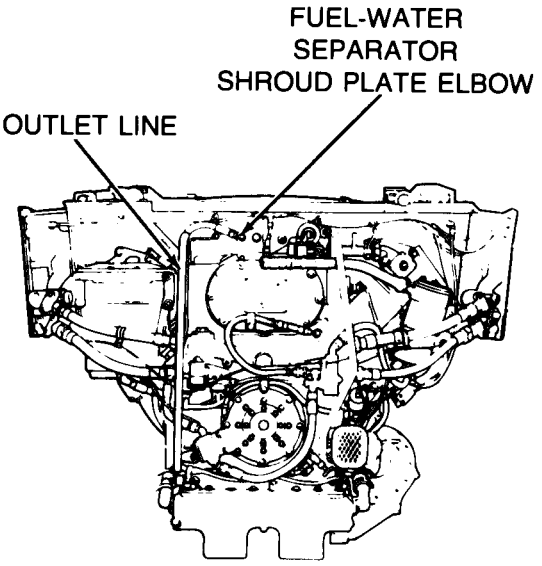
First Technician (Front of Engine)

- Disconnect fuel water separator outlet hose from shroud plate elbow.
- Place hose in suitable container.

Second Technician (Operator's Station)

- Set FUEL PUMPS switch ON, for a few seconds, then OFF.
- Check if fuel flows freely into container.

Does fuel flow freely?



NO

YES

20 **Replace shroud plate elbow (page 7-20).**

TA250154

Symptom-11 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

21 **Check if fuel-water separator outlet hose is blocked.**

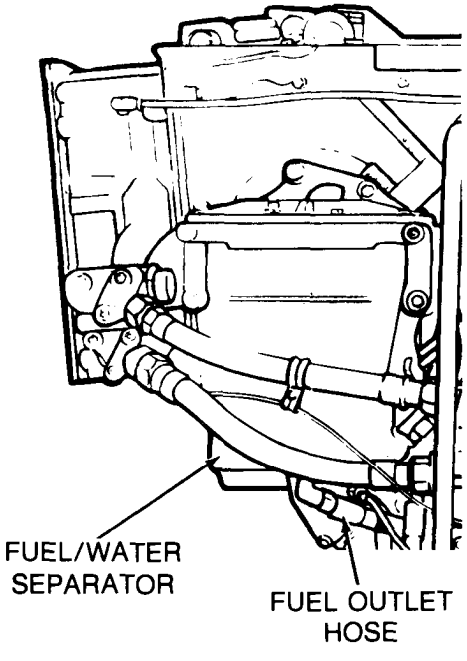
Both Technicians (Top of Engine)

- Connect fuel injector inlet line.
- Install front cooling fan (page 9-57).

First Technician (Front of Engine)

- Place suitable container under fuel-water separator.
- Disconnect fuel-water separator outlet hose from fuel-water separator.
- Using compressed air, check if hose is blocked.

Is hose blocked?



NO

YES

22 **Replace fuel-water separator outlet hose if blockage cannot be removed (page 7-34).**

TA250155

Symptom-11 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

23 **Check for fuel flow at fuel water separator inlet hose.**

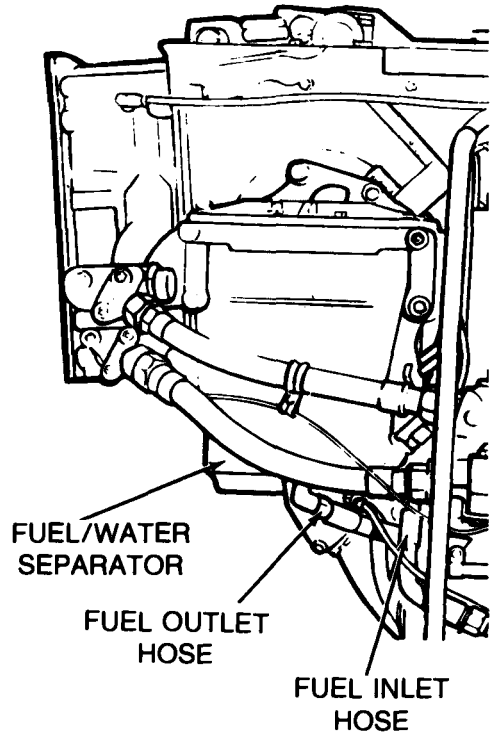
First Technician (Front of Engine)

- Connect fuel water separator outlet hose to shroud plate elbow and to fuel water separator.
- Disconnect fuel water separator inlet hose from fuel water separator.
- Place end of hose in suitable container.

Second Technician (Operator's Station)

- Set FUEL PUMPS switch ON for a few seconds, then OFF.
- Check if fuel flows freely into container.

Does fuel flow freely?



NO

YES

24 **Perform fuel water separator operational checks (page 7-211)(automatic drain test).**

TA250156

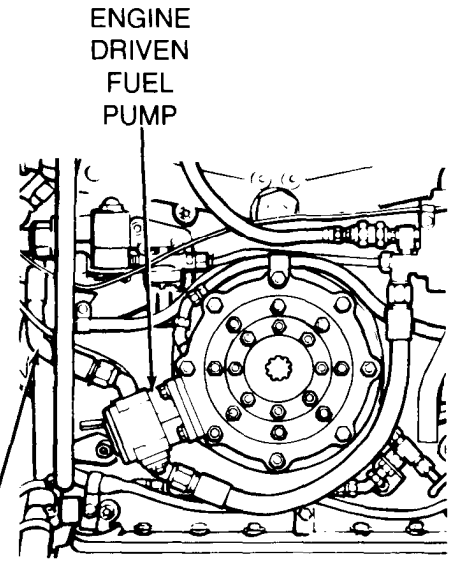
Symptom-11 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

25 **Check if fuel-water separator inlet hose is blocked.**

First Technician (Front of Engine)

- Disconnect fuel-water separator inlet hose from engine driven fuel pump.
- Using compressed air, check if hose is blocked.

Is hose blocked?



YES → **26** **Replace fuel-water separator hose if blockage cannot be removed (page 7-20).**

NO

TA250157

Symptom-11

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

27 **Check for fuel flow on inlet side of engine driven fuel pump.**

First Technician (Front of Engine)

- Connect fuel-water separator inlet hose to engine driven fuel pump and fuel-water separator.
- Disconnect fuel backflow valve outlet hose from engine driven fuel pump.
- Place suitable container under hose.

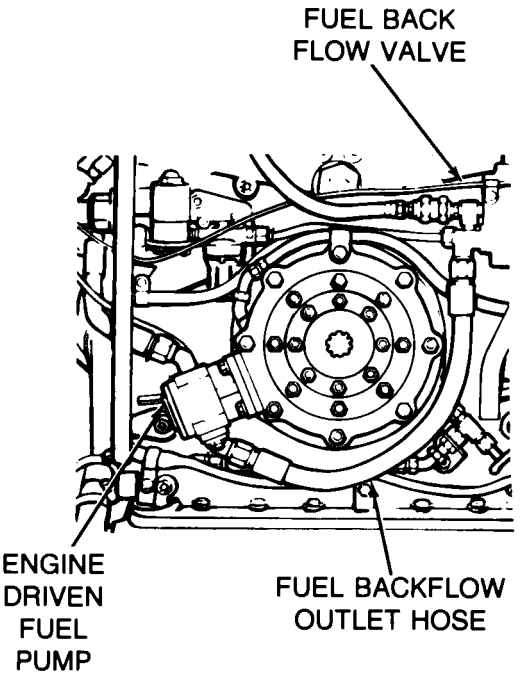
Second Technician (Operator's Station)

- Set FUEL PUMPS switch ON for a few seconds, then OFF.

First Technician (Front of Engine)

- Check if fuel flows freely into container.

Does fuel flow freely?



NO

YES

28 **Replace engine driven fuel pump (page 7-37).**

TA250158

Symptom-11

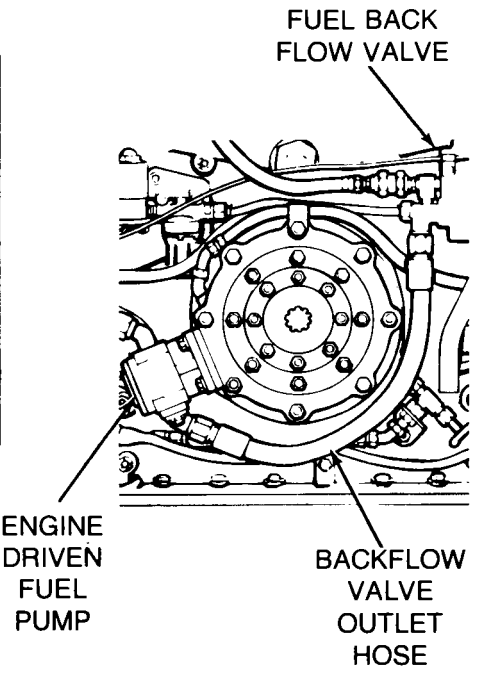
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

29 **Check backflow valve outlet hose for blockage.**

First Technician (Front of Engine)

- Disconnect backflow valve outlet hose from backflow valve.
- Blow air thru backflow valve outlet hose.

Is backflow valve outlet hose blocked?



NO

YES

30 **Replace backflow valve outlet hose if blockage cannot be removed (page 7-40).**

TA250159

Symptom-11 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

31 **Check for fuel flow at inlet side of fuel backflow valve.**

First Technician (Front of Engine)

- Disconnect primary fuel filter outlet hose from backflow valve inlet.
- Place suitable container under hose.

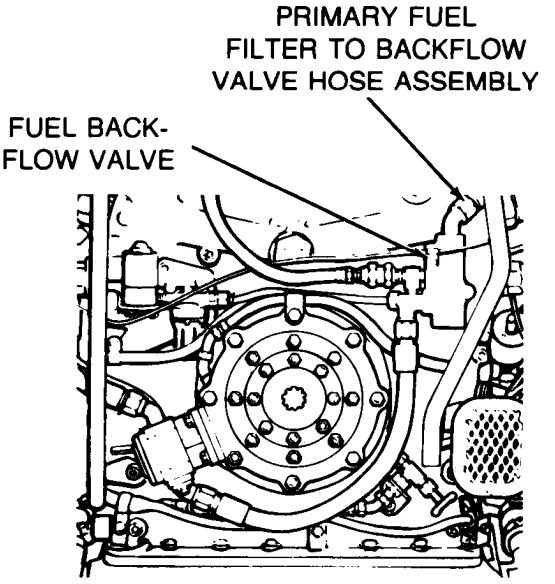
Second Technician (Operator's Station)

- Set FUEL PUMPS switch ON for a few seconds, then OFF.
- Set MASTER BATTERY switch OFF.

First Technician (Front of Engine)

- Check if fuel flows freely into container.

Does fuel flow freely?



NO

YES

32 **Replace fuel backflow valve (page 7-25).**

TA250160

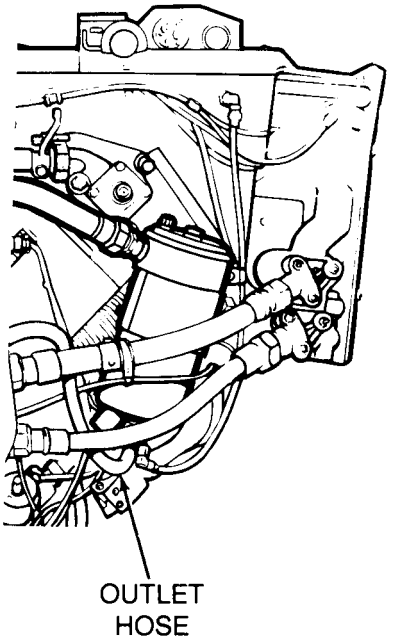
Symptom-11 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

33 **Check if primary fuel filter outlet hose is blocked or defective.**

First Technician (Front of Engine)

- Install backflow valve outlet hose.
- Place suitable container under primary fuel filter.
- Disconnect primary fuel filter outlet hose from primary fuel filter body.
- Using compressed air, check if hose is blocked.

Is hose blocked?



NO

YES

34 **Remove blockage. If blockage cannot be removed, replace primary fuel filter outlet hose (page 7-40).**

TA250161

Symptom-11

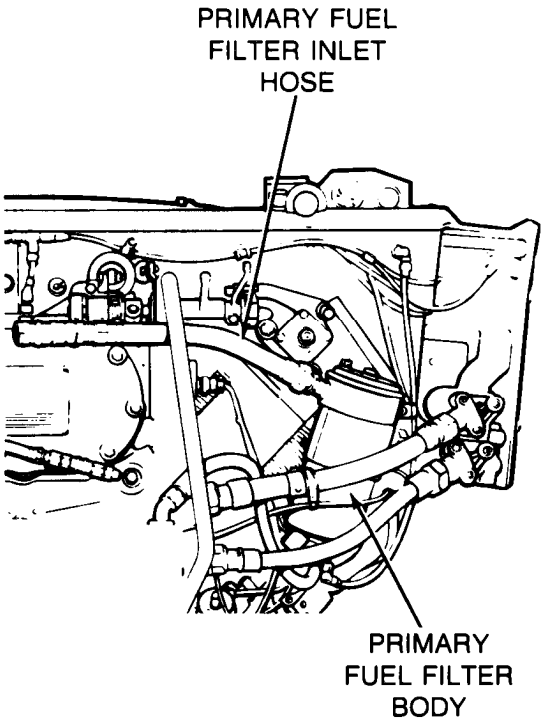
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

35 **Check if primary fuel filter inlet hose assembly is defective.**

First Technician (Front of Engine)

- Install primary fuel filter outlet hose assembly.
- Disconnect primary fuel filter inlet hose from filter body.
- Disconnect primary fuel filter inlet hose at quick disconnect.
- Remove male end of quick disconnect from primary fuel filter inlet hose.
- Using compressed air, check to see if hose is blocked.

Is primary fuel filter inlet hose blocked?



36 **Replace primary fuel filter inlet hose if blockage cannot be removed (page 7-173).**

YES

NO

TA250162

Symptom-11 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

37 **Check quick disconnect for proper operation.**

Second Technician (Inside Hull)

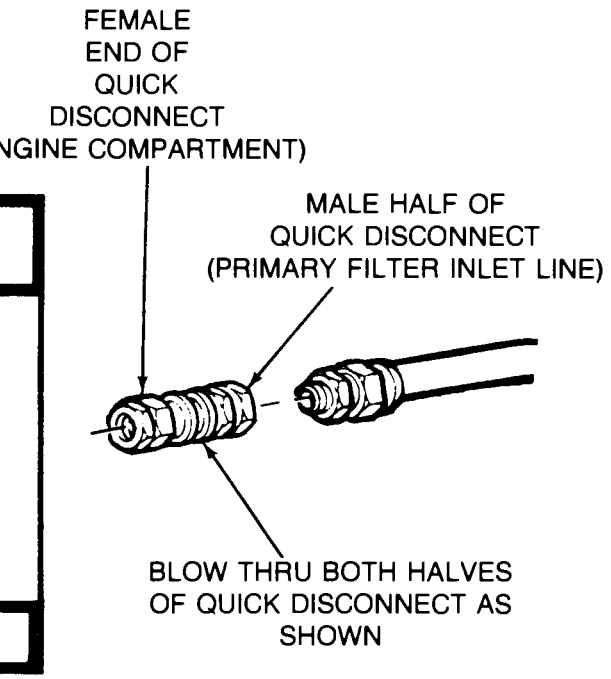
- Remove female half of quick disconnect from main fuel feed hose.
- Connect both halves of quick disconnect together.
- Using pressurized air, check to see if quick disconnect is blocked.

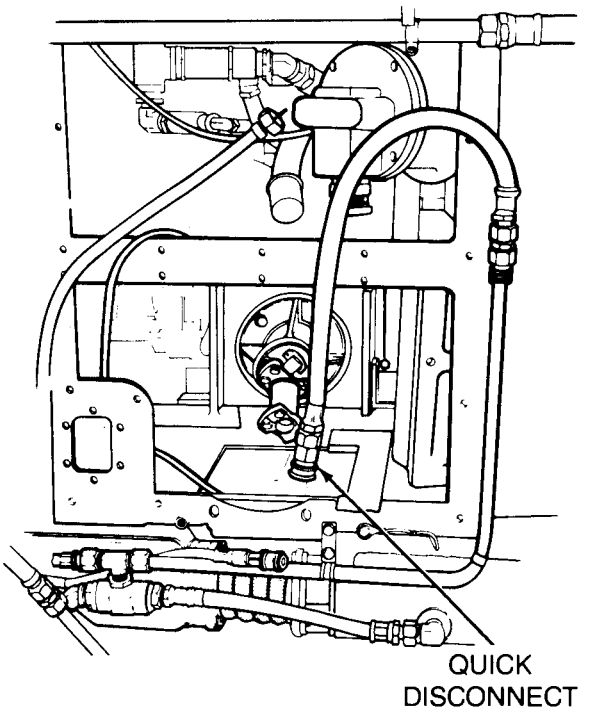
Is quick disconnect blocked?

38 **Replace quick disconnect if blockage cannot be removed.**

YES

NO





TA250163

Symptom-11

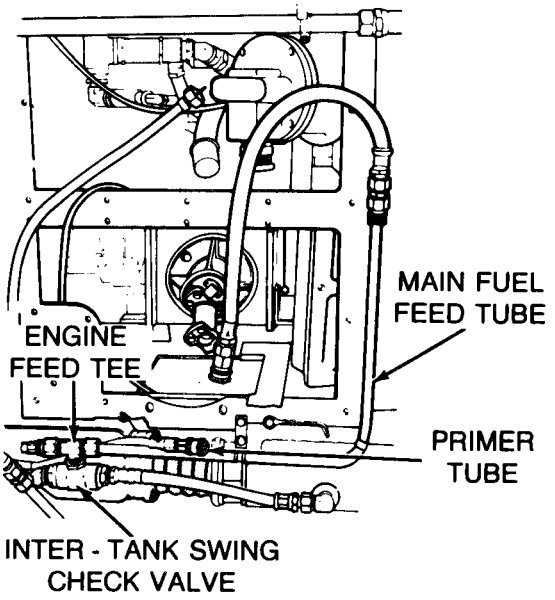
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

39 **Check fuel lines from main fuel hose to right and left fuel tanks.**

Both Technicians (Engine)

- Connect primary fuel filter hose to primary fuel filter body.
- Connect male half of quick disconnect to primary fuel filter hose.
- Drain both fuel tanks (page 7-184).
- Remove the following lines/valves and check for blockage by using compressed air:
  - Main fuel feed tube
  - Engine fuel feed primer tube
  - Engine feed tee
  - Inter-tank swing check valve

Are any lines or valves blocked?



NO

40

- **Install all lines, tubes and check valve.**
- **Install powerplant (page 5-14).**
- **Fill fuel tanks (TM 5-5420-202-10).**
- **Notify support maintenance of engine problem.**

YES

41

- **If blockage cannot be removed, replace the following parts as necessary:**
  - **Main fuel feed tube (page 7-294).**
  - **Engine feed fuel primer tube (page 7-294).**
  - **Engine feed tee (page 7-294).**
  - **Inter-tank swing check valve (page 7-228).**
- **Install all lines, tubes and check valve.**
- **Install powerplant (page 5-14).**
- **Fill fuel tanks (TM 5420-202-10).**

TA250164

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING

Symptom-12

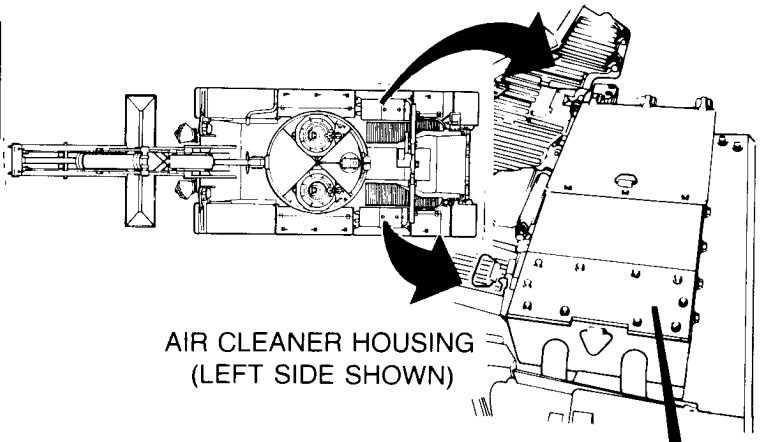
ONE AIR CLEANER BLOWER FAN WILL NOT WORK.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

NOTE

This procedure is the same for both left and right air cleaners.



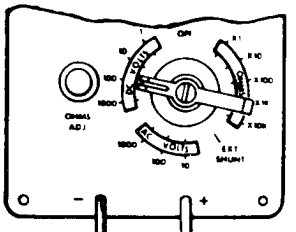
1 Check air cleaner fan motor power jumper lead at inoperative fan motor for electrical power.

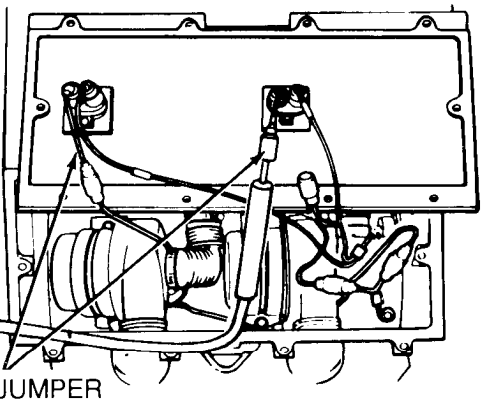
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Disabled Air Cleaner)

- Remove air cleaner motor cover (page 7-98).
- Disconnect air cleaner fan motor power jumper lead from fan motor electrical lead connector.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).



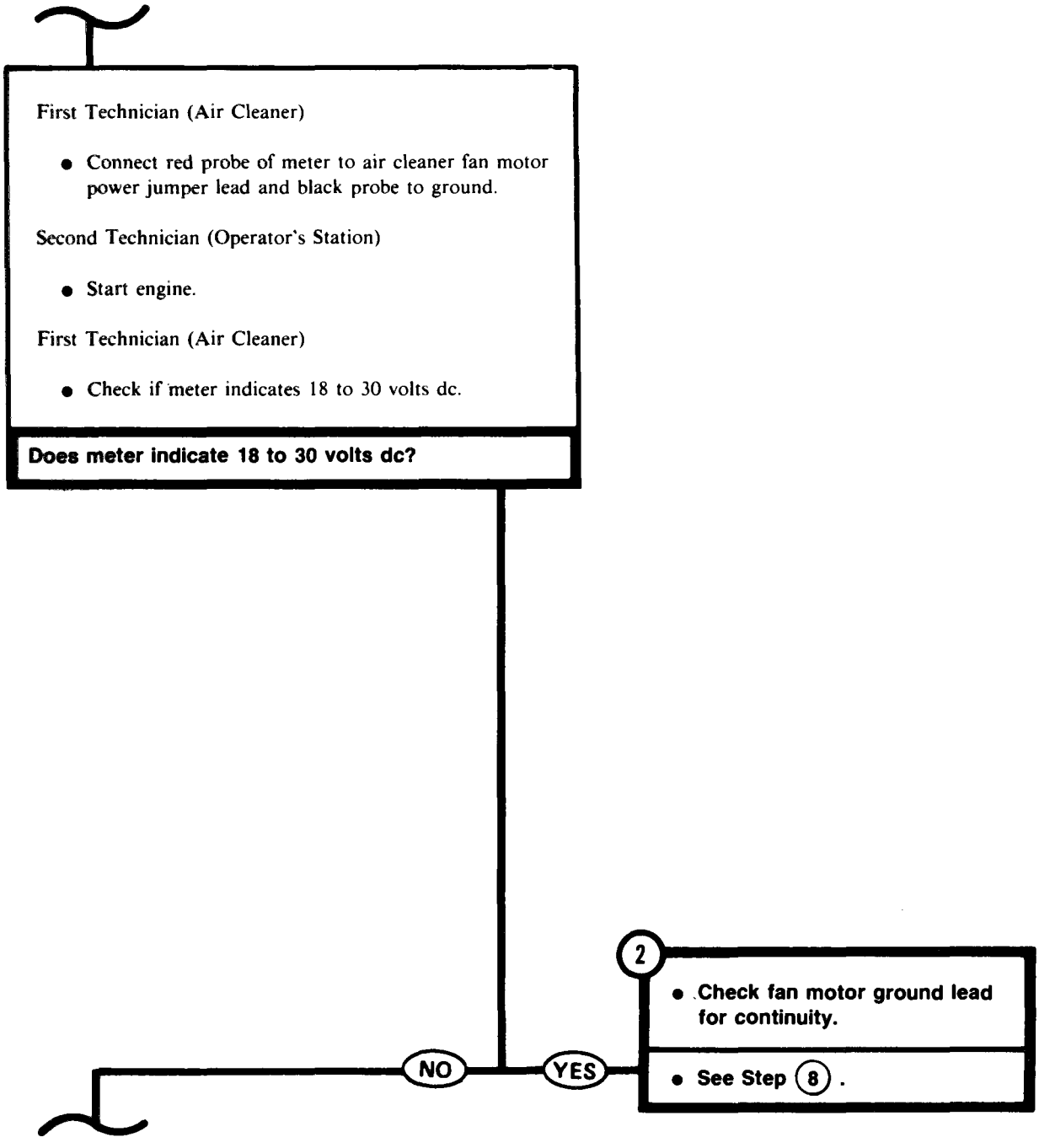


TA250165

Symptom-12

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

STEP (1) CONTINUED



TA250166

Symptom-12

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

3 Check air cleaner fan motor power jumper lead for continuity.

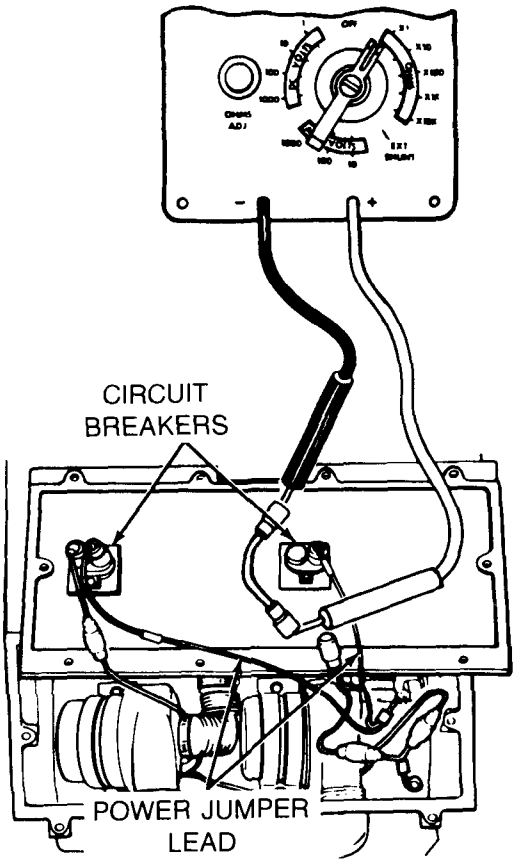
Second Technician (Operator's Station)

- Stop engine.

First Technician (Air Cleaner)

- Disconnect air cleaner fan motor power jumper lead from fan motor circuit breaker.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect meter probes to connector contact at each end of power jumper lead.
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

NO

4 Replace fan motor power jumper lead.

TA250167

Symptom-12

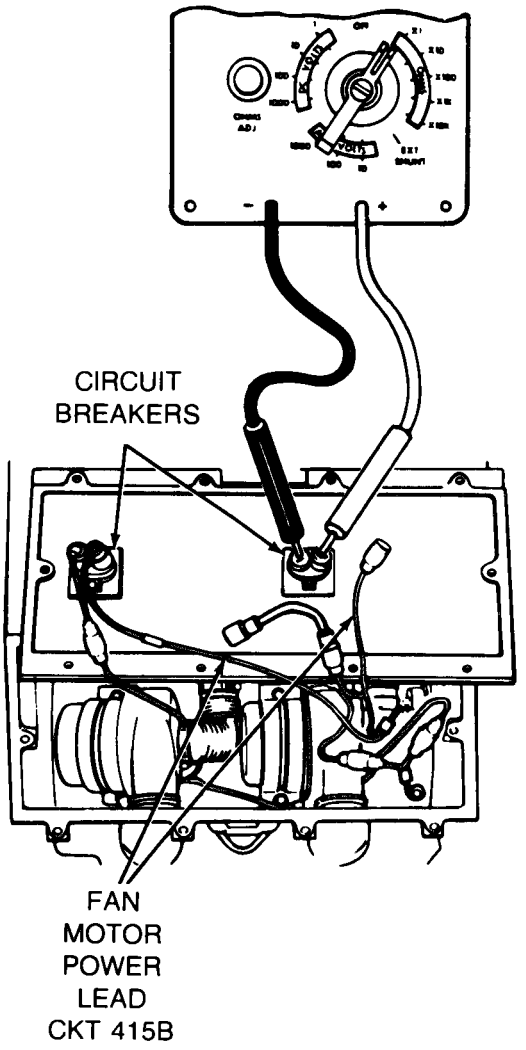
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

5 **Check fan motor circuit breaker for continuity.**

First Technician (Air Cleaner)

- Disconnect fan power lead (CKT 415B) from circuit breaker of inoperative fan motor.
- Connect probes of meter to contacts of circuit breaker.
- Check if meter indicates continuity.

Does meter indicate continuity?



NO

6

- **Replace fan motor circuit breaker (page 7-109).**

YES

7

- **Replace air cleaner fan motor power lead (page 7-76).**
- **Connect power jumper lead to circuit breaker and motor lead.**

TA250168

Symptom-12 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

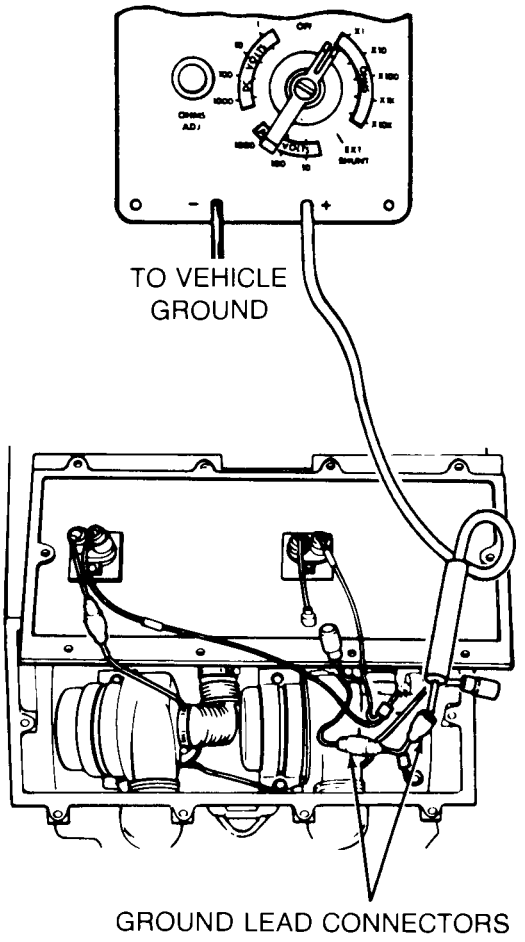
FROM STEP 2

8 **Check fan motor ground lead for continuity.**

First Technician (Air Cleaner)

- Disconnect air cleaner fan ground lead connector from inoperative fan motor.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to ground lead connector contact and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?



NO

9
- **Replace fan motor ground lead (page 7-110).**
- **Connect fan motor jumper lead to fan motor electrical lead.**

YES

10 **Replace air cleaner fan motor (page 7-102).**

TA250169

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING

Symptom-13

BOTH AIR CLEANER BLOWER FANS IN ONE AIR CLEANER ASSEMBLY WILL NOT WORK.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check rear accessory harness (CKT 415B), at inoperative air cleaner for electrical power.

First Technician (Top Deck)

- Open top deck grille doors at inoperative air cleaner.
- Disconnect rear accessory harness connector (CKT 415B) at inoperative air cleaner.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to rear accessory harness connector (CKT 415B) at inoperative air cleaner and black probe to ground.

Second Technician (Operator's Station)

- Start engine and run at idle.

First Technician (Top Deck)

- Check if meter indicates 18 to 30 volts dc.

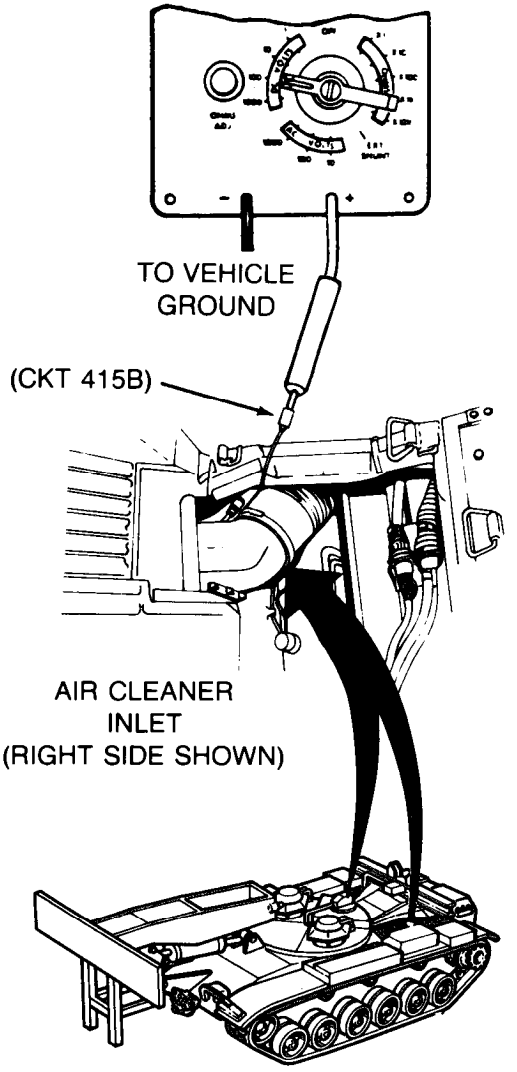
Does meter indicate 18 to 30 volts dc?

YES

NO

2 Check front accessory harness (CKT 415B) at bulkhead disconnect for electrical power.

See Step (6).



TA250170

Symptom-13

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

3 **Check air cleaner fan motor power harness for continuity.**

Second Technician (Operator's Station)

- Stop engine.

First Technician (Top Deck)

- Remove fan motor cover from inoperative air cleaner (page 7-103).
- Disconnect fan motor power harness connector from one of the circuit breakers.
- Set multimeter to OHMS X1 scale and zero meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to fan motor power harness (CKT 415B) at rear accessory harness connector.
- Connect black probe of meter to fan motor power harness (CKT 415B) at circuit breaker connector.
- Check if meter indicates continuity.

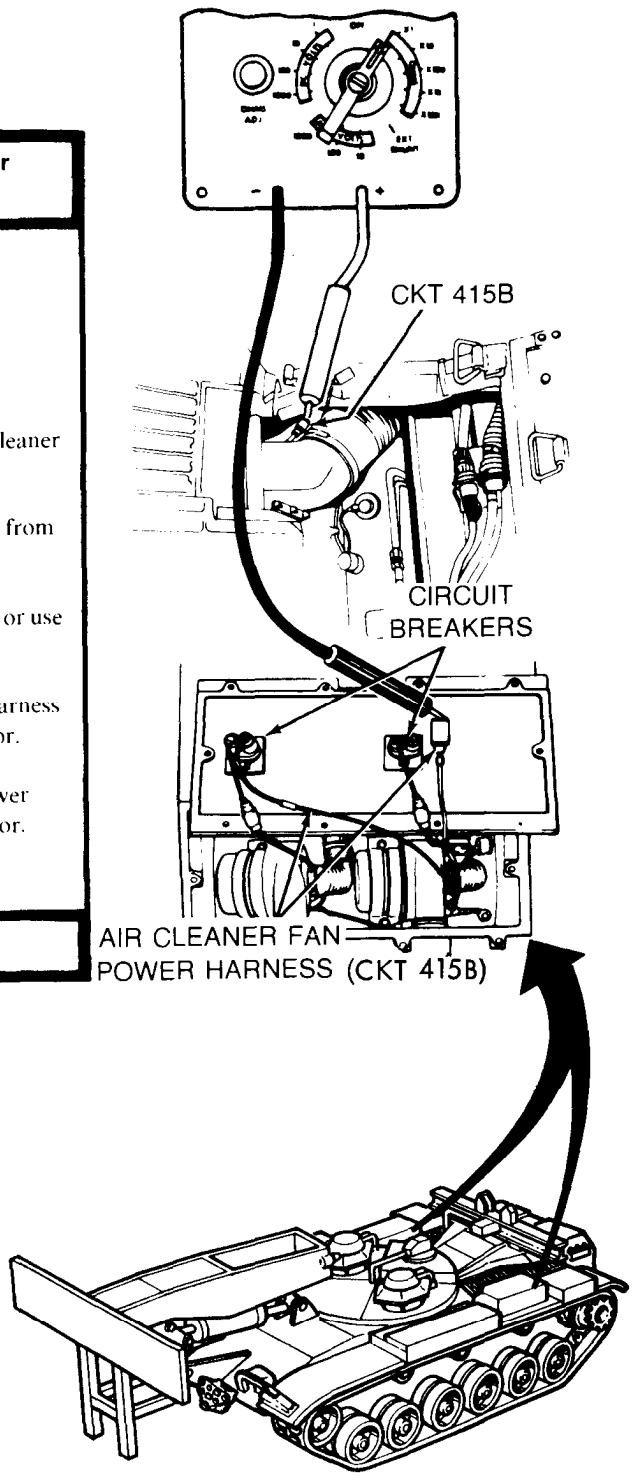
Does meter indicate continuity?

4 **Replace fan motor power harness (page 7-76).**

NO

5
- **Replace fan ground electrical lead (page 7-110)**
- **Connect fan motor power harness to rear accessory harness and to circuit breaker.**

YES



TA250171

Symptom-13
FROM STEP 2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

6 Check front accessory harness (CKT 415B) at bulkhead disconnect for electrical power.

Second Technician (Operator's Station)

- Stop engine.

First Technician (Top Deck)

- Reconnect rear accessory harness connector (CKT 415B) at inoperative air cleaner.
- Close top deck grille doors.

First Technician (Commander's Station)

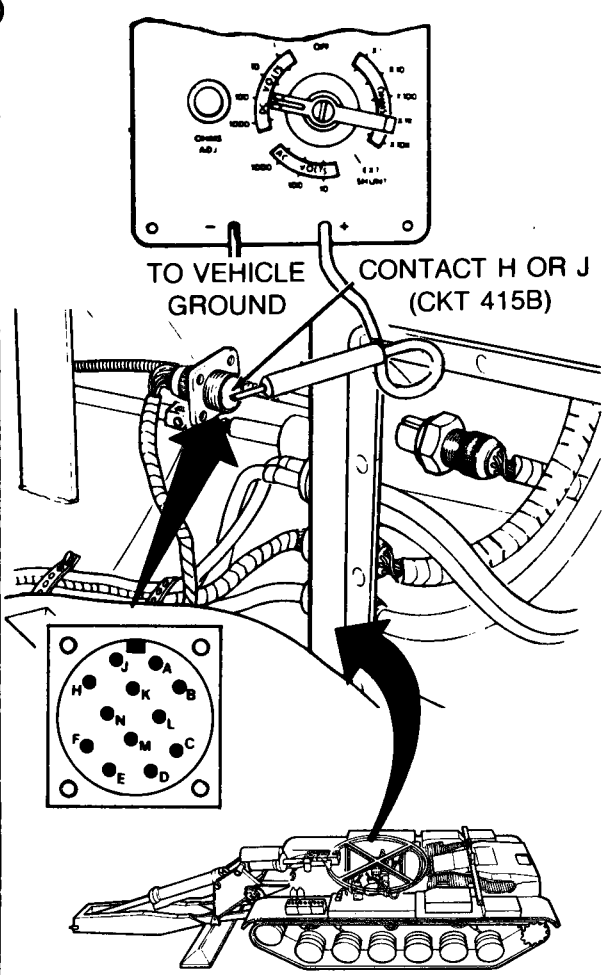
- Displace front accessory harness connector (CKT 415B) at bulkhead disconnect (page 10-269).
- If right air cleaner is inoperative, connect red probe of meter to contact H (CKT 415B) of front accessory harness connector at bulkhead disconnect and black probe to ground.
- If left air cleaner is inoperative, connect red probe of meter to contact J (CKT 415B) of front accessory harness connector at bulkhead disconnect and black probe to ground.

Second Technician (Operator's Station)

- Start engine.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

TA250172

Symptom-13

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

STEP (6) CONTINUED

Second Technician (Operator's Station)

- Stop engine.

Did meter indicate 18 to 30 volts dc?

NO

7

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 415B wires at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of defective front accessory harness.**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**

YES

8

- **Inspect rear accessory harness for bent/broken connector contacts or loose CKT 415B wires at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of defective rear accessory harness.**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**

TA250173

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING

Symptom-14

ALL AIR CLEANER BLOWER FANS WILL NOT WORK

NOTE

This procedure is to be performed by two persons. The lead person shall be referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check if BATT/GEN INDICATOR pointer is in green area.

Second Technician (Operator's Station)

- Start engine.
- Check if BATT/GEN INDICATOR gage pointer is in green area.
- Stop engine.

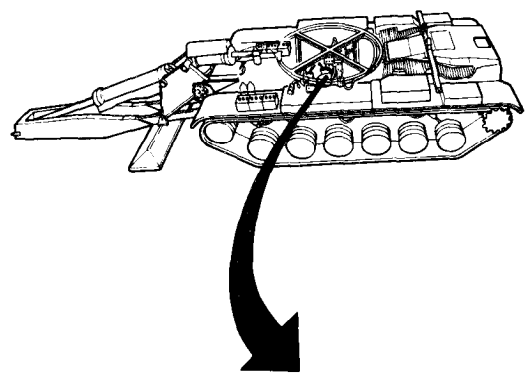
Was BATT/GEN INDICATOR gage pointer in green area?

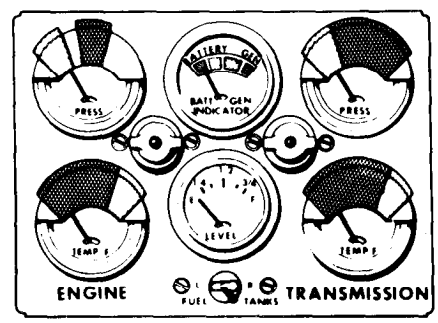
2 See Symptom 31: GENERATOR/REGULATOR SYSTEM IS NOT WORKING.

NO

YES

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN





INSTRUMENT PANEL

TA250174

Symptom-14

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

NOTE

If your vehicle does not have a smoke generator, go to Step (5).

(3) Check air cleaner fan motors without smoke generator switch harness installed.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Remove right-hand floor access cover (page 17-7).
- Disconnect smoke generator switch harness from air cleaner blower relay and front accessory harness.
- Connect front accessory harness (CKT 415A) to air cleaner blower relay.

Second Technician (Operator's Station)

- Start engine.

First Technician (Air Cleaner)

- Check air cleaner fan motors for operation.

Second Technician (Operator's Station)

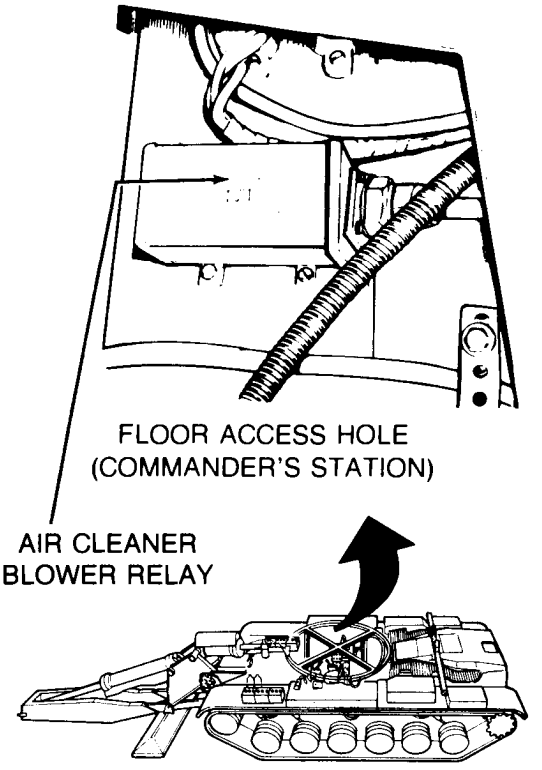
- Stop engine.

Are air cleaner fan motors operating?

NO

YES

(4) Replace smoke generator switch harness (page 21-16).



TA250175

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

Symptom-14

5 **Check front accessory harness connector (CKT 415A) at air cleaner blower relay for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Remove right-hand floor access cover if not already removed (page 17-7).
- Disconnect front accessory harness connector (CKT 415A) from air cleaner blower relay.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact A (CKT 415A) of front accessory harness connector and black probe to ground.

Second Technician (Operator's Station)

- Start engine.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Second Technician (Operator's Station)

- Stop engine.
- Set MASTER BATTERY switch OFF.

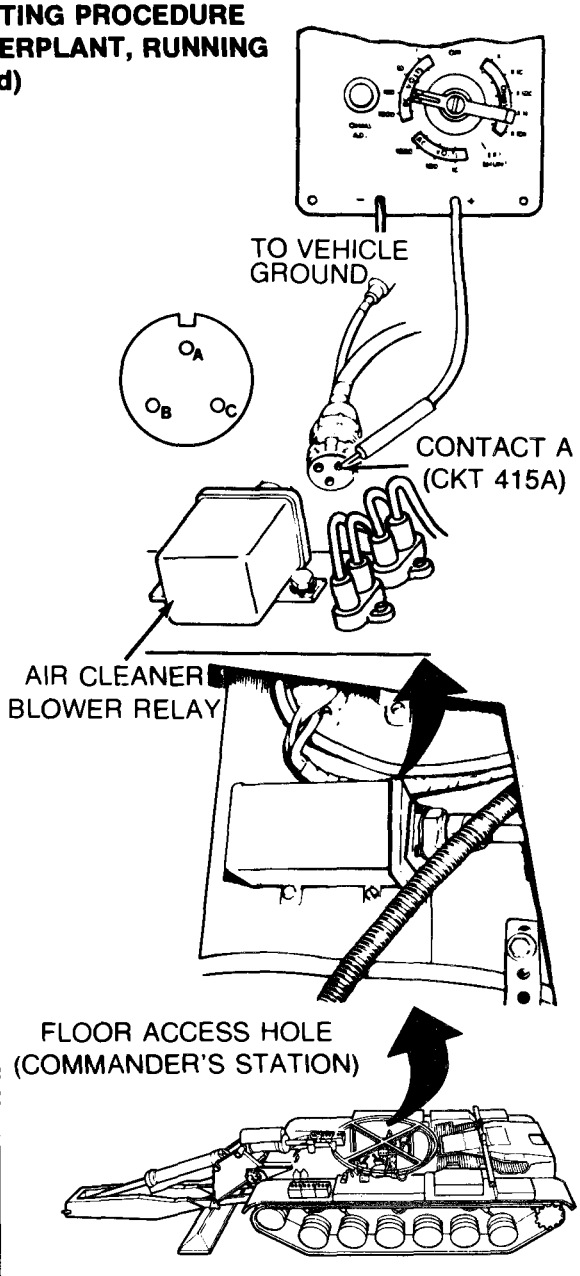
Did meter indicate 18 to 30 volts dc?

YES

NO

6

- **Check voltage regulator connector from pin A to pin H for continuity.**
- **See Step (15).**



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

TA250176

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

Symptom-14

7 **Check front accessory harness (CKT 415) at air cleaner blower relay for electrical power.**

First Technician (Commander's Station)

- Connect red probe of meter to contact B (CKT 415) of front accessory harness connector and black probe to ground.

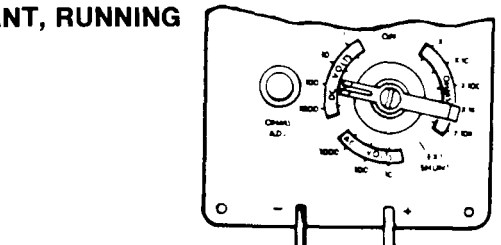
Second Technician (Operator's Station)

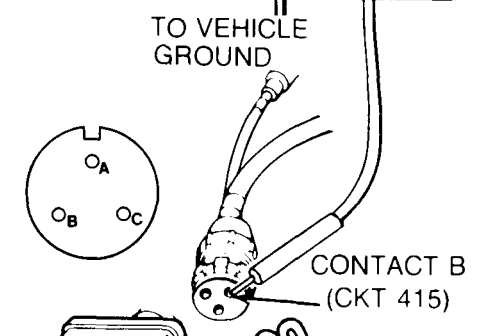
- Set MASTER BATTERY switch ON.

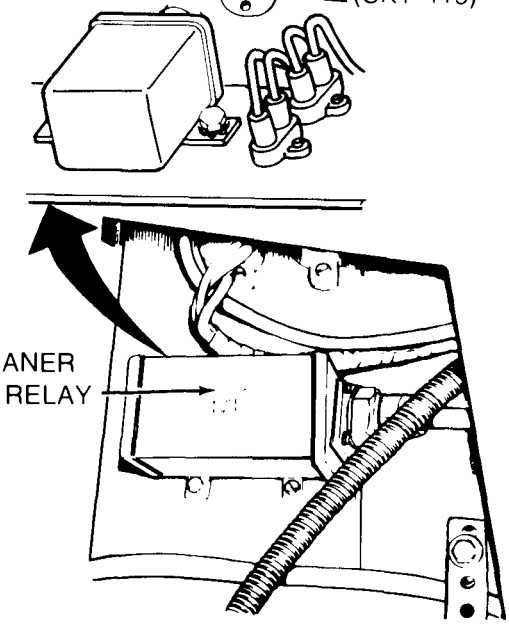
First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?







YES

NO

8

- **Check hull power harness at intermediate connector (CKT 415) for electrical power.**

- **See Step (12) .**

TA250177

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

Symptom-14

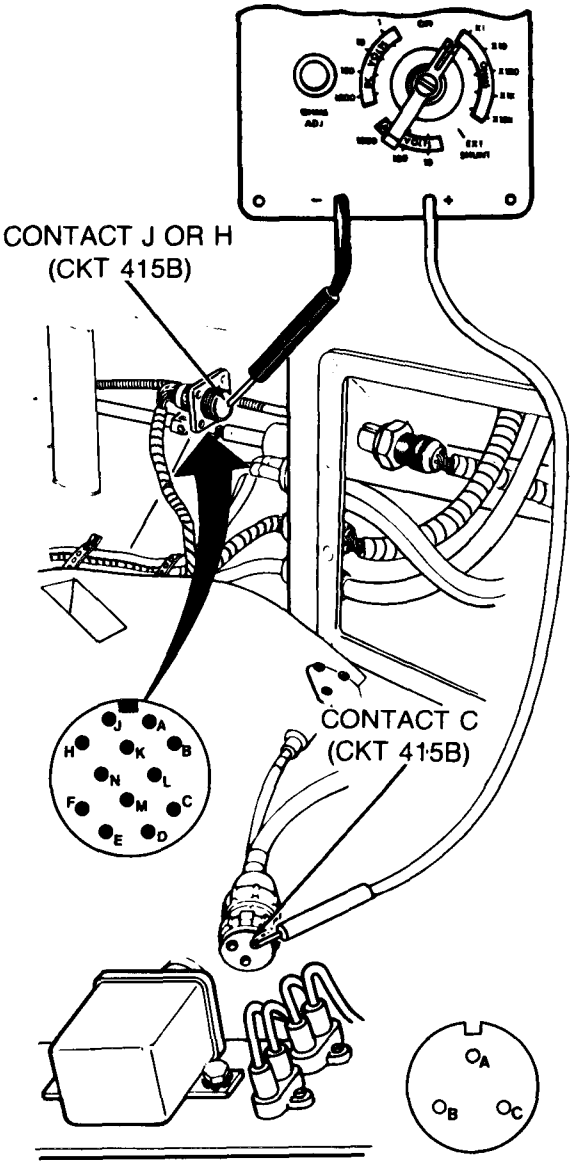
9 **Check front accessory harness (CKT 415B) from air cleaner blower relay to bulkhead disconnect for continuity.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Displace front accessory harness connector (CKT 415B) from bulkhead disconnect (page 10-269).
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to front accessory harness connector contact C (CKT 415B) at air cleaner blower relay.
- Connect black probe of meter to front accessory harness connector contact J or H (CKT 415B) at bulkhead disconnect.



TA250178

Symptom-14

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

STEP (9) CONTINUED

- Check if meter indicates continuity.

Does meter indicate continuity?

NO

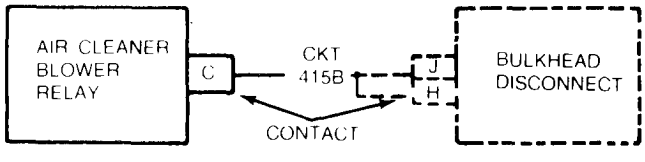
10

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 415B wires at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of defective front accessory harness.**
- **If installed, connect smoke generator switch harness to blower motor relay.**
- **Connect front accessory harness connector to smoke generator switch harness, or to air cleaner blower relay if smoke generator is not installed.**
- **Install floor access cover (page 17-7).**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**

YES

11

- **Replace air cleaner blower relay (page 10-163).**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**



TA250179

Symptom-14
FROM STEP 8

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

12 Check hull power harness at intermediate connector (CKT 415) for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

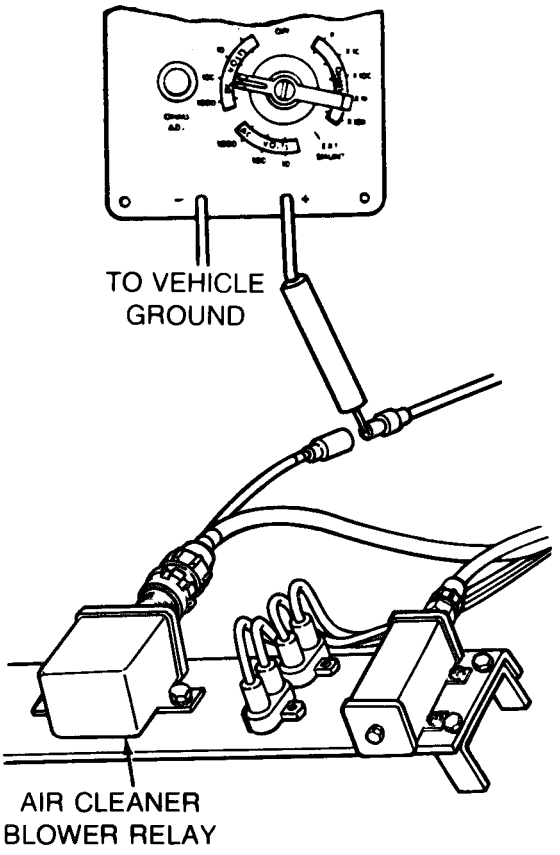
First Technician (Commander's Station)

- If installed, connect smoke generator switch harness to air cleaner blower relay.
- Connect front accessory harness connector to smoke generator switch harness, or to air cleaner blower relay if smoke generator is not installed.
- Disconnect hull power harness (CKT 415) from front accessory harness at intermediate connector.
- Connect red probe of meter to hull power harness connector and black probe to ground.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)



TA250180

Symptom-14

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

STEP (12) CONTINUED

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

NO

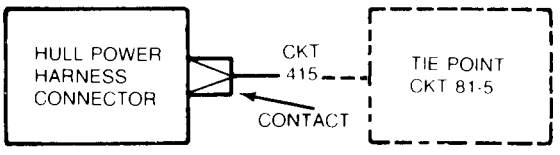
13

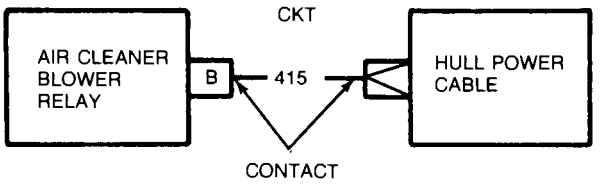
- **Inspect hull power harness for bent/broken connector contacts or loose CKT 415 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective hull power harness.**
- **Connect front accessory harness connector to hull power harness connector.**
- **Install floor access cover (page 17-7).**

YES

14

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 415 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Connect front accessory harness connector to hull power harness connector.**
- **Install floor access cover (page 17-7).**





TA250181

Symptom-14

FROM STEP 6

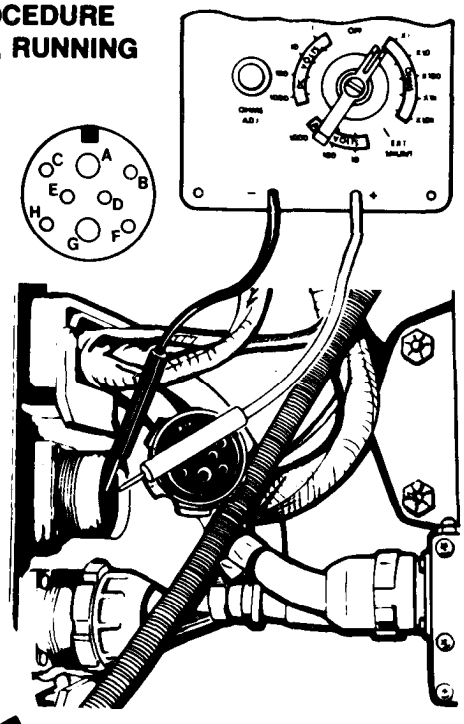
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

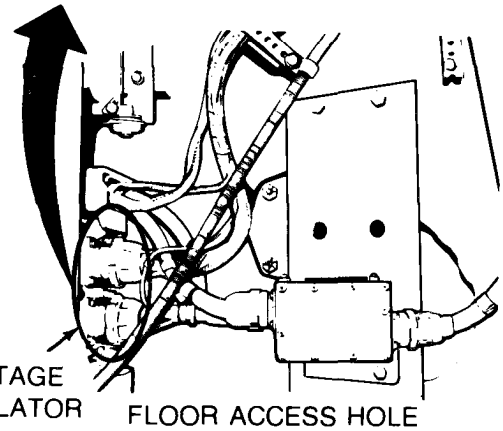
15 Check voltage regulator connector from pin A to pin H for continuity.

First Technician (Commander's Station)

- If installed, connect smoke generator switch harness to air cleaner blower relay.
- Reconnect front accessory harness to smoke generator switch harness, or to air cleaner blower relay if smoke generator is not installed.
- Disconnect front accessory harness connector (CKT 1, 2, 415A, 478) from voltage regulator.
- Set meter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-85).
- Connect red probe of meter to contact A of voltage regulator connector.
- Connect black probe of meter to contact H of voltage regulator connector.
- Check if meter indicates continuity.

Does meter indicate continuity?





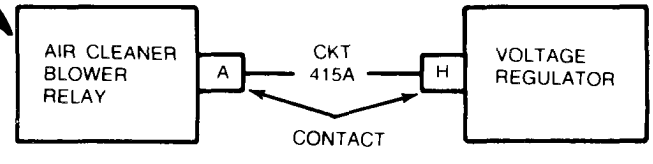
YES

16

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 415A wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Reconnect front accessory harness connector to voltage regulator.**
- **Install floor access cover (page 17-7).**

NO

17 Replace voltage regulator (page 10-18).

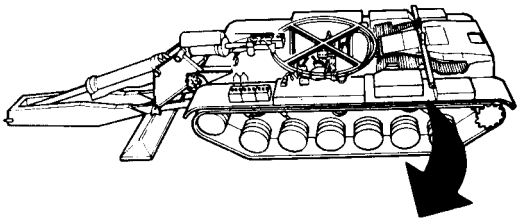


TA250182

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING

Symptom-15

ENGINE OIL TEMPERATURE GAGE SHOWS HIGH TEMPERATURE (POWERPLANT WARNING LAMP ON).



NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check right and left engine oil coolers for leaks.

First Technician (Top Deck)

- Open left and right top deck grille doors.

Second Technician (Operator's Station)

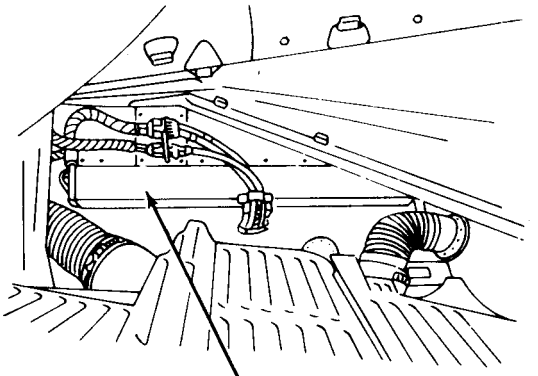
- Start engine.

First Technician (Top Deck)

- Visually check area around right and left oil coolers for leaks.

Second Technician (Operator's Station)

- Stop engine.



ENGINE OIL COOLER
(VIEW LOOKING DOWN THROUGH LEFT TOP DECK GRILLE DOORS)

Is either engine oil cooler leaking?

YES

2 Replace engine oil cooler that leaks (page 6-19).

NO

TA250183

Symptom-15

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

3 **Check engine oil cooler lines for leaks or damage.**

First Technician (Top Deck)

- Have powerplant removed (page 5-2).

First Technician (Powerplant)

- Ground hop powerplant (page 5-25).

Second Technician (Operator's Station)

- Start engine.

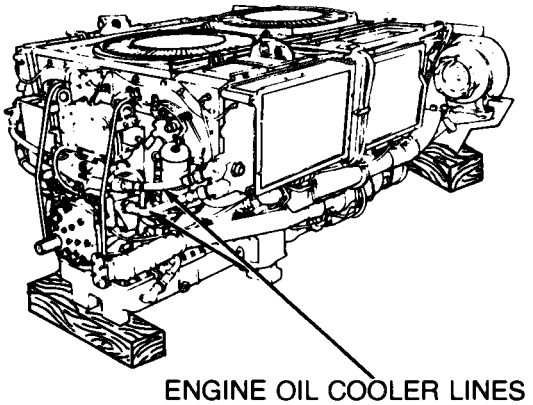
First Technician (Left and Right Side of Powerplant)

- Visually check engine oil cooler lines for damage or leaks.

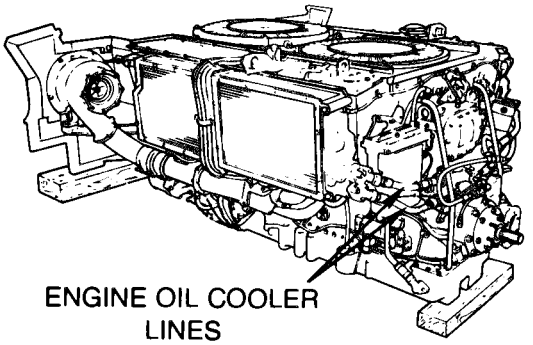
Second Technician (Operator's Station)

- Stop engine.

Are any engine oil cooler lines leaking or damaged?



RIGHT FRONT VIEW



LEFT FRONT VIEW

YES

4 **Replace defective oil cooler lines (page 6-50).**

NO

TA250184

Symptom-15

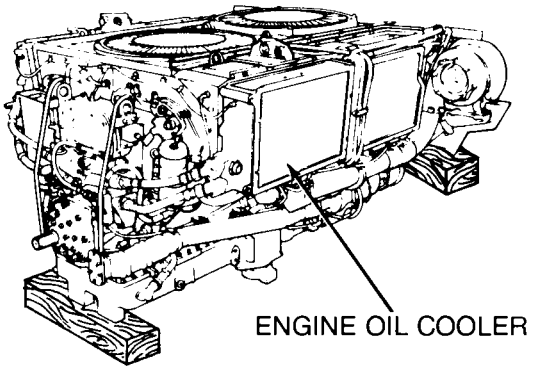
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

5 **Check engine oil coolers and screens for clogged cores or dirty condition.**

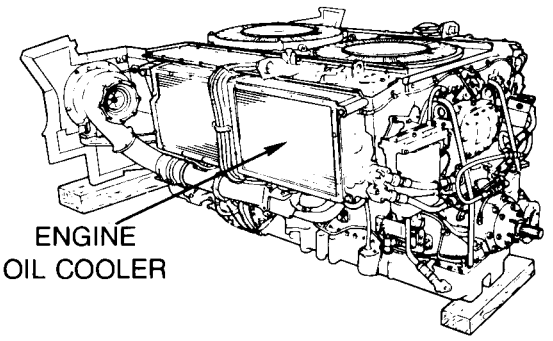
First Technician (Powerplant)

- Remove left and right engine oil coolers screens (page 6-51).
- Shine light through cores and screens.
- Check for clogged or dirty condition.

Are engine oil coolers and screens clean?



RIGHT FRONT VIEW



LEFT FRONT VIEW

YES

NO

6 **Clean engine oil coolers (page 6-48) and screens.**

TA250185

Symptom-15

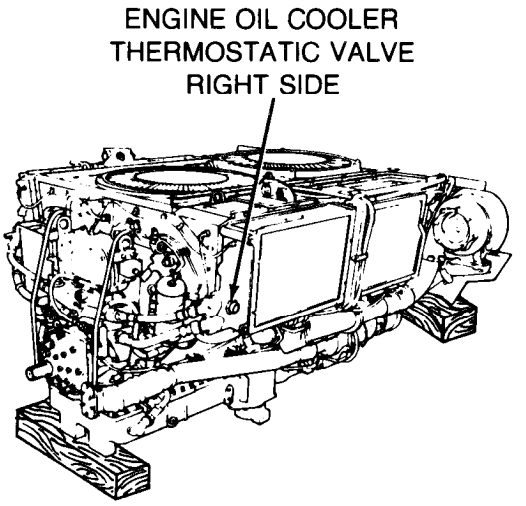
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

7 **Check if right side and left side engine oil cooler thermostatic valves operate correctly.**

First Technician (Powerplant)

- Remove right side and left side engine oil cooler thermostatic valves (page 6-15).
- Test both thermostatic valves (page 6-17).

Do both thermostatic valves pass test?



(POWERPLANT RIGHT SIDE)

NO

8 **Replace defective thermostatic valve (page 6-15).**

YES

9

- **Notify support maintenance of engine problem.**
- **Install powerplant (page 5-14).**

TA250186

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING

Symptom-16

ENGINE OIL LEVEL TOO LOW (EXCEEDS 3.5 QUARTS PER HOUR WHILE RUNNING).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check right and left engine oil coolers for leaks.

First Technician (Top Deck)

- Open left and right top deck grille doors.

Second Technician (Operator's Station)

- Start engine.

First Technician (Top Deck)

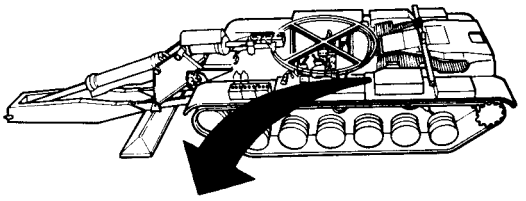
- Visually check area around right and left oil coolers for leaks.

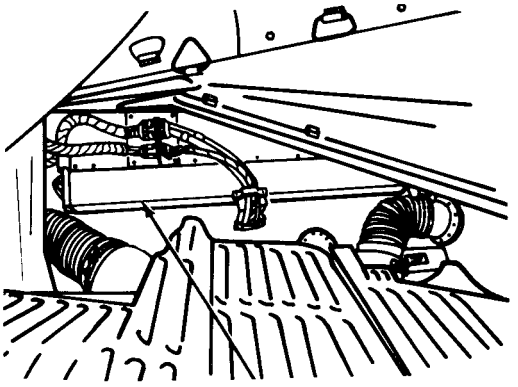
Second Technician (Operator's Station)

- Stop engine.

Is either engine oil cooler leaking?

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN





LEFT ENGINE OIL COOLER
(VIEW LOOKING DOWN THROUGH LEFT TOP DECK GRILLE DOORS)

NO

YES

2 Replace engine oil cooler that leaks (page 6-19).

TA250187

Symptom-16

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

3 **Check engine oil filter cover and engine drain valve for leaks.**

First Technician (Rear of Crew Compartment)

- **Remove engine upper access cover (page 17-11).**

Second Technician (Operator's Station)

- Start engine.

First Technician (Rear of Crew Compartment)

- Check for leaks at engine oil filter cover and drain valve.

Second Technician (Operator's Station)

- Stop engine.

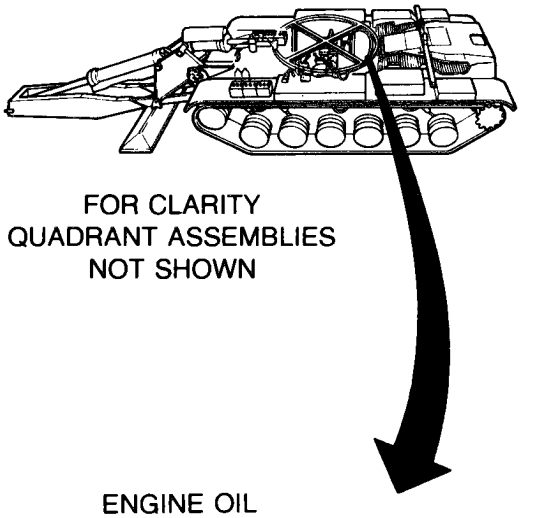
Is there leakage at the engine oil filter cover or drain valve?

YES

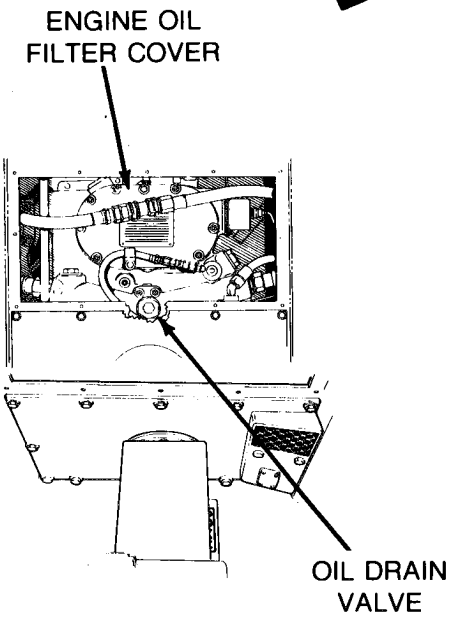
4

- **Replace engine oil filter cover gasket (page 6-76).**
- **Tighten engine oil drain valve.**

NO



FOR CLARITY
QUADRANT ASSEMBLIES
NOT SHOWN



FRONT OF ENGINE—VIEWED FROM
REAR OF CREW COMPARTMENT
(UPPER ACCESS COVER REMOVED)

TA250188

Symptom-16

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

NOTE

If STE/ICE is available, perform Test No. 14 COMPRESSION UNBALANCE (page 4-86).

If STE/ICE is not available, go to Step ⑤ .

⑤ Check for leaks at fan drive oil seals.

First and Second Technician (Top Deck)

- Remove engine cooling fans (page 9-55).
- Install fan rotor hub spacers (Item 2, Chapter 3, Section I)(page 5-38).

Second Technician (Operator's Station)

- Start engine.

First Technician (Top of Engine)

- Check for oil leaks around both fan drive oil seals.

Second Technician (Operator's Station)

- Stop engine.

Is either engine fan drive oil seal leaking?

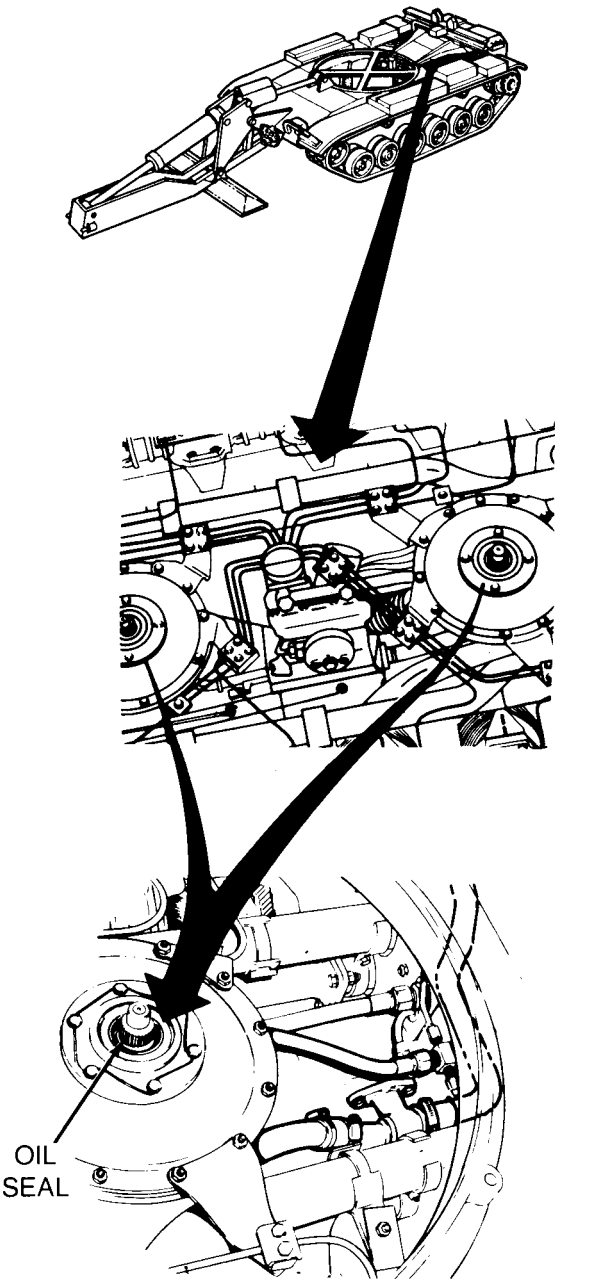
⑥

- **Remove fan rotor hub spacers (page 5-39).**
- **Replace defective fan drive oil seals (page 9-59).**

YES

NO

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



TA250189

Symptom-16

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

NOTE

Locator views continued on next page.

7 Check oil lines, tubes, plugs and thermostatic valves for leaks or damage.

First Technician (Top Deck)

- Have powerplant removed (page 5-2).
- Ground hop powerplant (page 5-25).

Second Technician (Operator's Station)

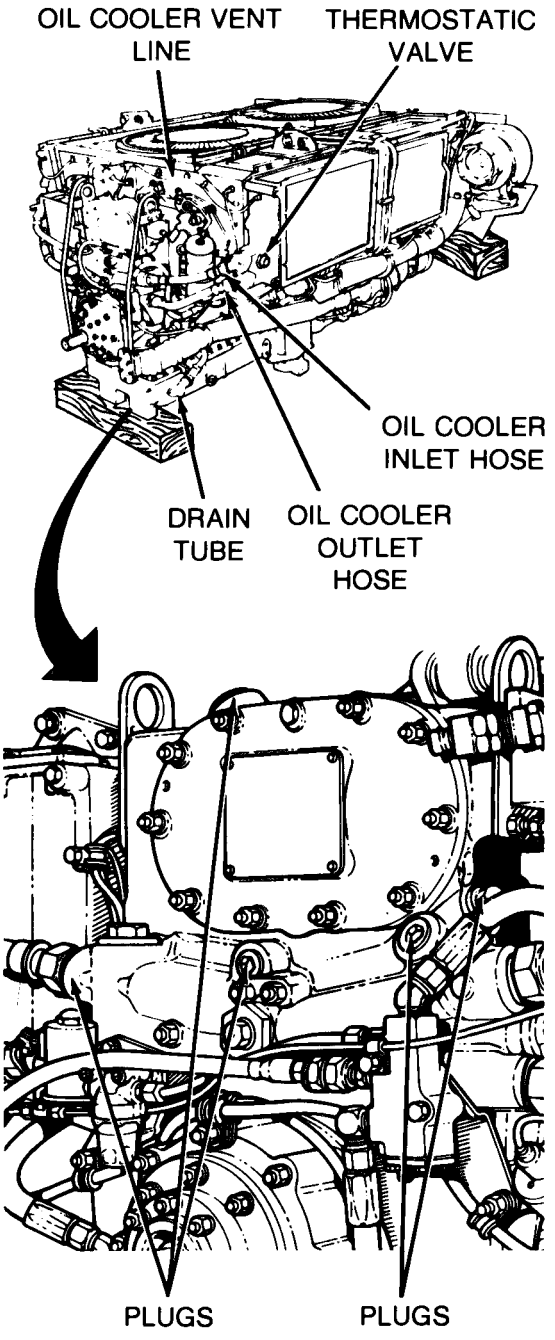
- Start engine.

First Technician (Powerplant)

- With engine idling, visually check the following for leaks and damage:
  - Left and right oil cooler inlet and outlet lines.
  - Left and right drain tubes.
  - Oil cooler vent line.
  - Plugs.
  - Engine oil filler tube.
  - Oil cooler thermostatic valves.
  - Engine oil drain plug.

Second Technician (Operator's Station)

- Stop engine.



TA250190

Symptom-16

STEP 7 CONTINUED

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

Are any of the oil lines, tubes, drain plugs, or thermostatic valves leaking or damaged?

YES

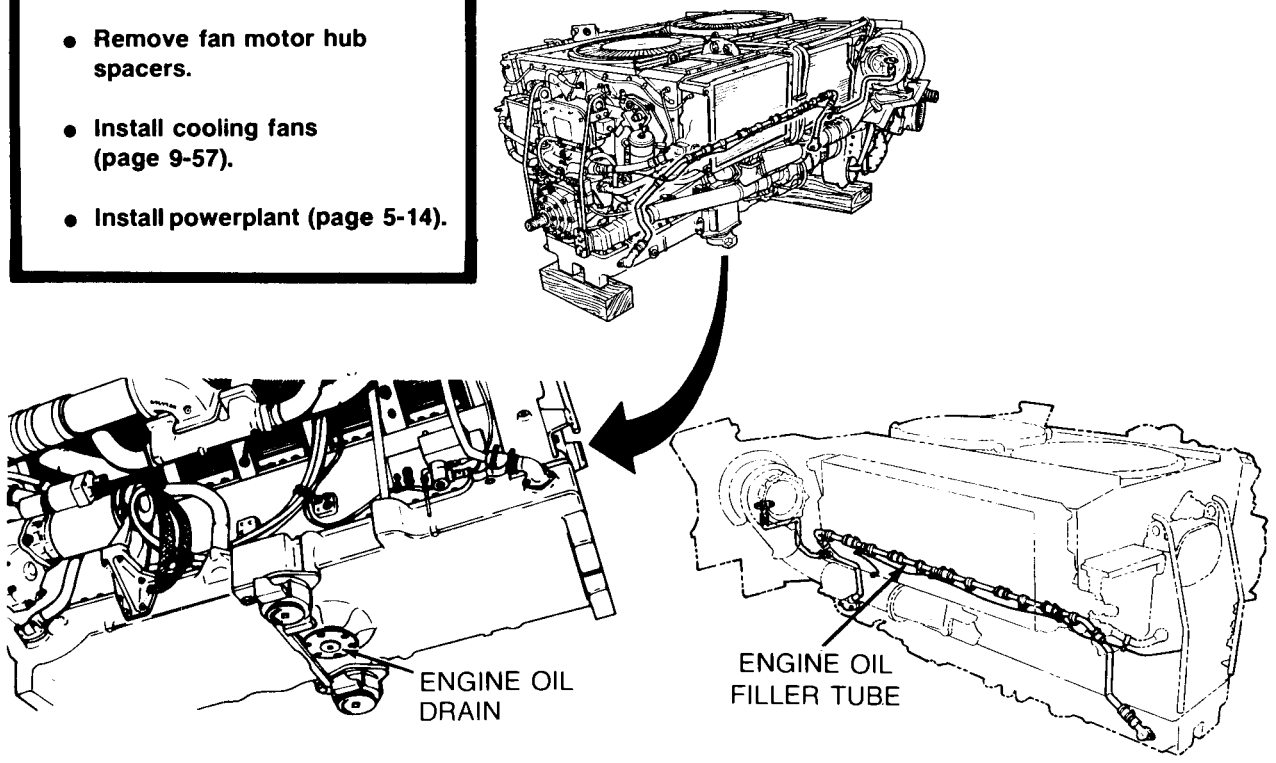
8

- If leaking or damaged, replace:
  - Oil cooler inlet lines and outlet lines (page 6-51).
  - Drain tubes (page 6-135).
  - Oil cooler vent line plugs (page 6-61).
  - Engine oil filler tube (page 6-88).
  - Engine oil drain plug (page 6-12).
  - Oil cooler thermostatic valve spacer ring (page 6-15).
- Remove fan motor hub spacers.
- Install cooling fans (page 9-57).
- Install powerplant (page 5-14).

NO

9

- Remove fan rotor hub spacers. (page 5-39).
- Install cooling fans (page 9-57).
- Install powerplant (page 5-14).
- Notify support maintenance that engine uses too much oil.



TA250191

Symptom 16.1

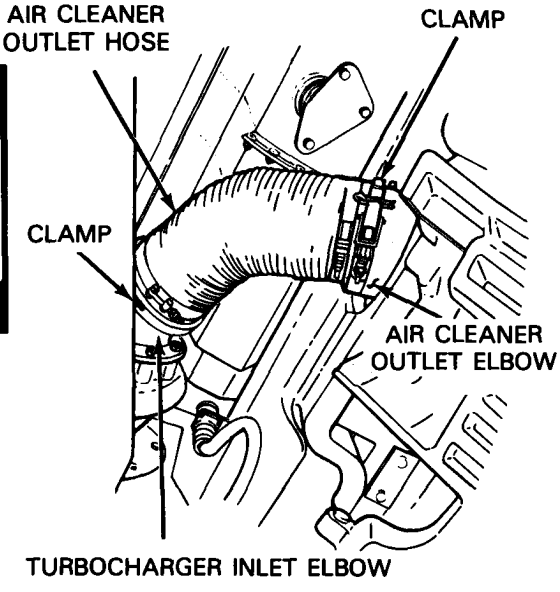
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING

POWERPLANT WARNING AND DUST DETECTOR WARNING LIGHTS ON, ONE (OR BOTH) DUST DETECTOR PRESSURE SWITCH(ES) TRIPPED, AND DUST DETECTOR FILTER STRIP INDICATES CONTAMINATION OF INTAKE AIR BY DUST.

1 Check air cleaner outlet hose assembly.

- Inspect for loose or damaged clamps at both ends of hose assembly.
- Inspect hose for damage.

Are outlet hose assembly and clamps serviceable?



YES

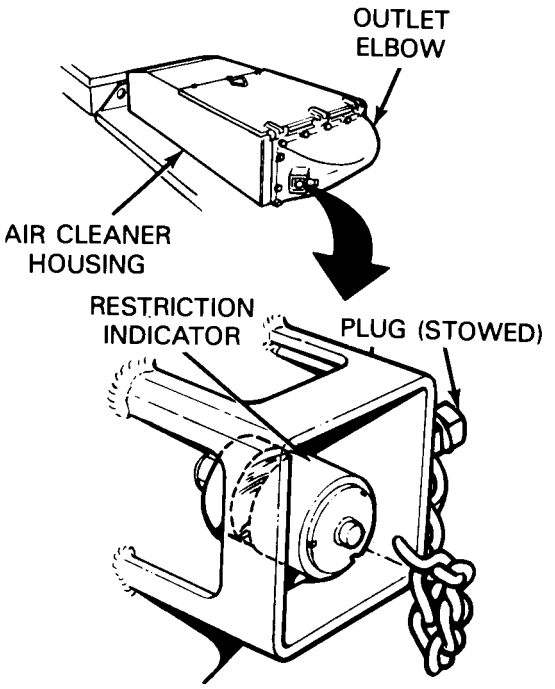
NO

2

- **Tighten loose clamps (page 7-84).**
- **Replace damaged clamps (page 7-84).**
- **Replace damaged hose (page 7-84).**
- **Change engine oil (LO 5-5420-202-12).**

Symptom 16.1

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)



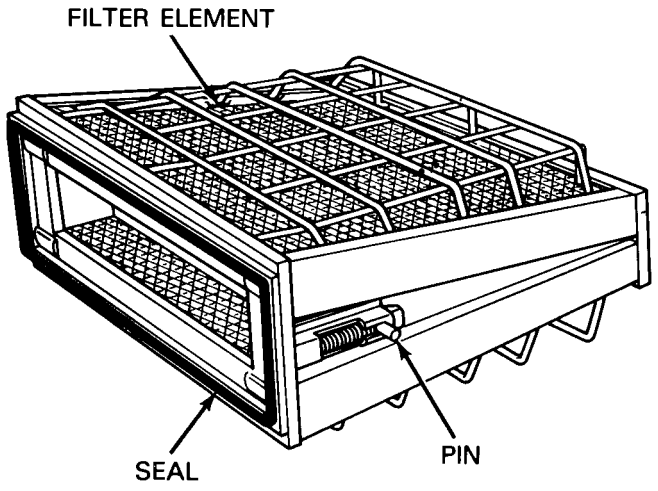
3 **Check air cleaner outlet elbow.**

- Check for presence of restriction indicator or plug.
- Check for presence of gasket between housing and outlet elbow.
- Check elbow for holes or cracks.

Is air cleaner outlet elbow serviceable?

NO — YES

4 **Replace air cleaner outlet elbow (page 7-101).**



5 **Check air cleaner filter element.**

- Remove air cleaner filter element (page 7-96).
- Check filter element for tears or holes.
- Check seal for tears, gaps, or hardness.
- Check spring loaded pin for damage.

Is air cleaner filter element serviceable?

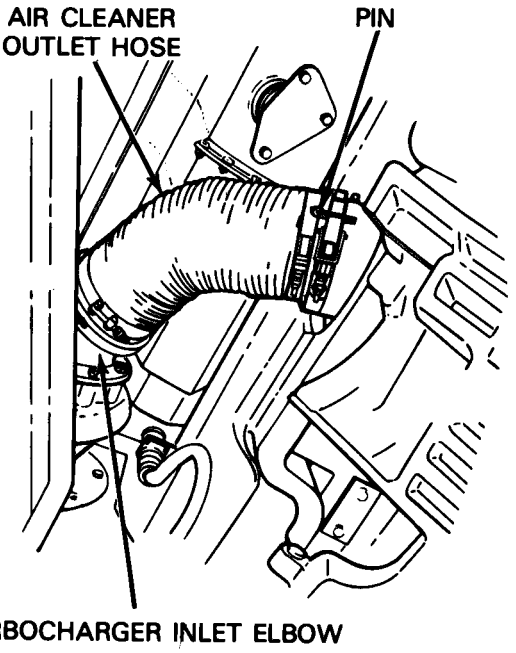
YES — NO

6

- **Replace air cleaner filter element (page 7-96).**
- **Change engine oil (LO 5-5420-202-12).**

Symptom 16.1

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)



7 **Check turbosupercharger inlet elbow.**

- Check for holes or cracks.
- Check for security.

Is turbosupercharger elbow serviceable?

YES

8
- **Replace turbosupercharger inlet elbow gasket (page 7-74).**
- **Change engine oil (LO 5-5420-202-12).**

NO

9
- **Replace turbosupercharger inlet elbow (page 7-74).**
- **Change engine oil (LO 5-5420-202-12).**

Symptom 16.2

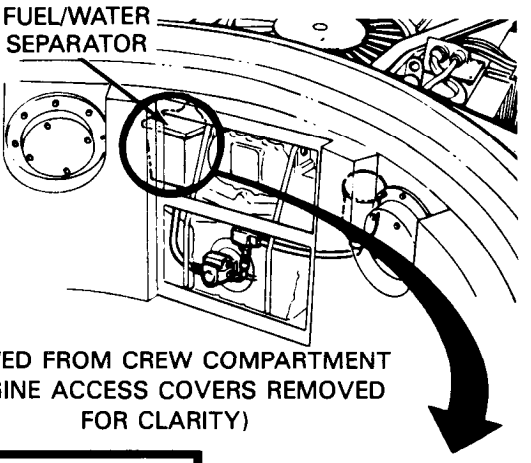
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

POWERPLANT WARNING AND DUST DETECTOR WARNING LIGHTS ON, ONE (OR BOTH) PRESSURE SWITCH(ES) TRIPPED, AND DUST DETECTOR FILTER STRIP INDICATES CONTAMINATION OF INTAKE AIR BY FUEL.

1 Check fuel water separator bleed cap.

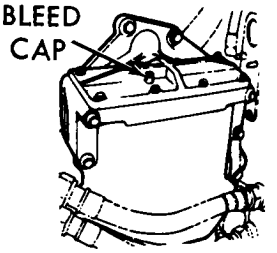
- Remove engine access cover.
- Inspect fuel/water separator bleed cap for security.

Is fuel water separator bleed cap leaking or loose?



VIEWED FROM CREW COMPARTMENT
(ENGINE ACCESS COVERS REMOVED
FOR CLARITY)

YES — NO



2

- **Tighten or replace bleed cap (page 7-190).**
- **Replace air cleaner filter element (page 7-96).**
- **Thoroughly clean inside air cleaner housing outlet elbow and outlet hose.**
- **Service dust detector filter strip(s) (page 7-130.14).**

Symptom 16.2

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

3 **Check primary fuel filter.**

- Inspect primary fuel filter bleed cap for security.
- **Is primary fuel filter bleed cap leaking or loose?**

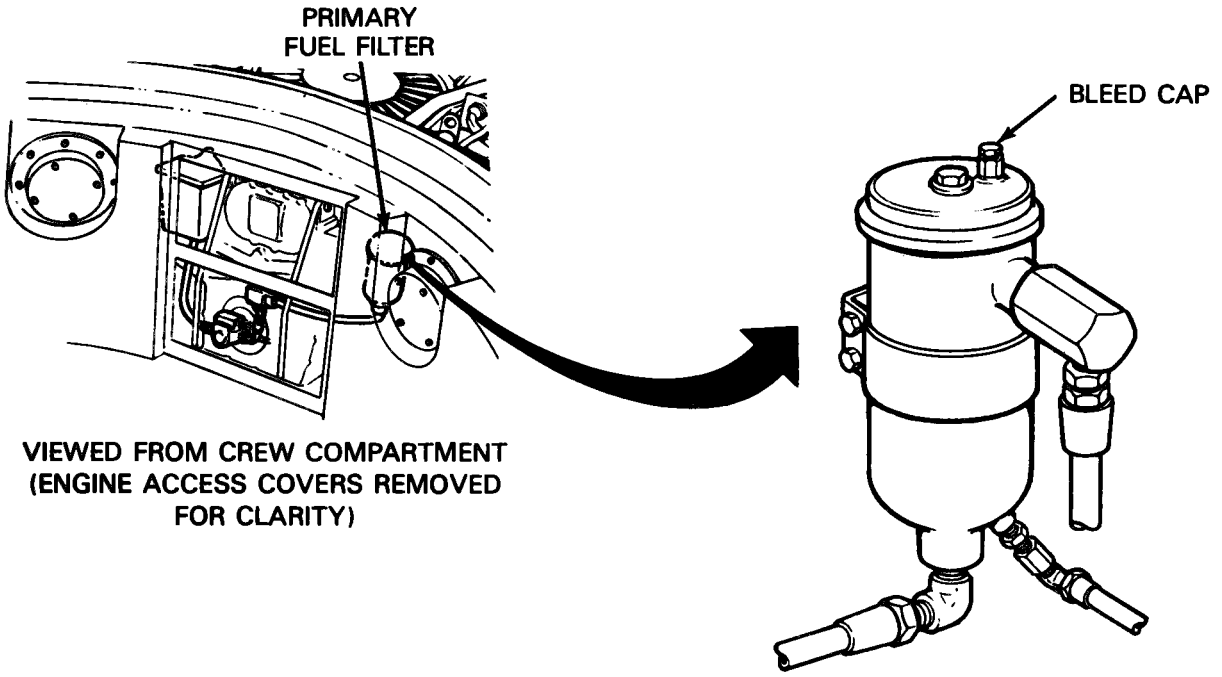
YES / **NO**

4

- **Tighten or replace bleed cap (page 7-190).**
- **Replace air cleaner filter element (page 7-96).**
- **Thoroughly clean inside air cleaner housing outlet elbow, outlet hose, and inlet hose.**
- **Service dust detector filter strip(s) (page 7-130.14).**

5

- **Replace air cleaner filter element (page 7-96).**
- **Thoroughly clean inside air cleaner housing outlet elbow, outlet hose, and inlet hose.**
- **Service dust detector filter strip(s) (page 7-130.14).**
- **Check for other fuel leaks.**



VIEWED FROM CREW COMPARTMENT
(ENGINE ACCESS COVERS REMOVED
FOR CLARITY)

Symptom 16.3

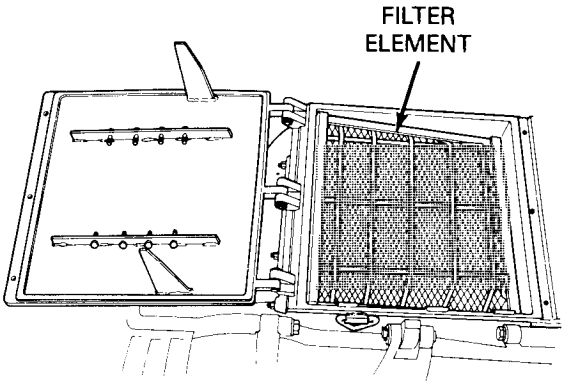
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

POWERPLANT WARNING AND DUST DETECTOR WARNING LIGHTS ON, ONE (OR BOTH) DUST DETECTOR PRESSURE SWITCH(ES) TRIPPED, AND DUST DETECTOR FILTER STRIP INDICATES CONTAMINATION OF INTAKE AIR BY SOOT.

1 Check air cleaner filter elements.

- Remove air cleaner filter element (page 7-96).
- Inspect air cleaner filter element.

Does element show evidence of soot or charring?



NO

2 Service dust detector filter strip (page 7-130.14).

YES

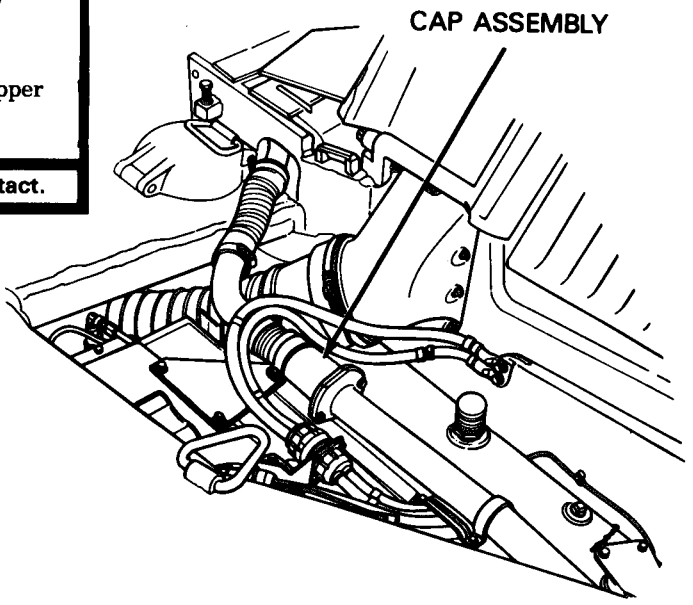
Symptom 16.3

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

3 **Replace or clean air cleaner element (page 7-96).**

- Remove cap assembly (Check valve) (page 8-14).
- Tilt cap assembly (check valve) side to side to verify flapper valve is free.
- Look inside cap assembly (check valve) to verify flapper valve is not damaged or missing.

Is cap assembly (check valve) flapper valve free and intact.



YES

4 **Install cap assembly (check valve) (page 8-16).**

NO

5 **Replace cap assembly (check valve) (page 8-16).**

Symptom 16.4

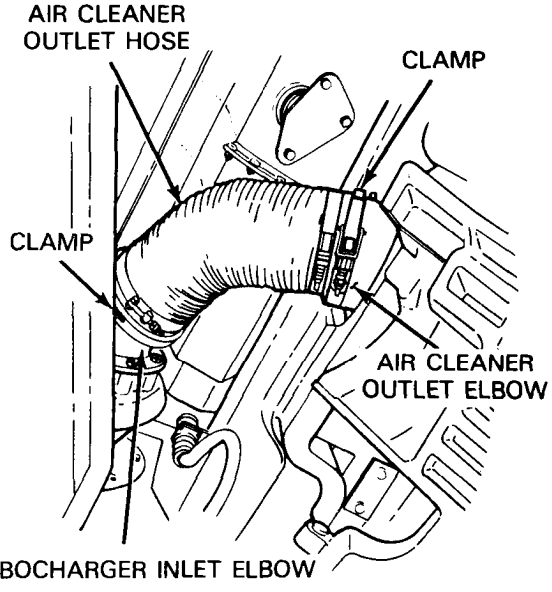
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

POWERPLANT WARNING AND DUST DETECTOR WARNING LIGHTS ON, ONE (OR BOTH) DUST DETECTOR PRESSURE SWITCH(ES) TRIPPED, AND DUST DETECTOR FILTER STRIP INDICATES CONTAMINATION OF INTAKE AIR BY WATER.

1 Check air cleaner outlet hose assembly.

- Inspect for loose or damaged clamps at both ends of hose assembly.
- Inspect hose for damage.

Are outlet hose assembly and clamps serviceable?



YES

NO

2

- **Tighten loose clamps (page 7-84).**
- **Replace damaged clamps (page 7-84).**
- **Replace damaged hose (page 7-84).**

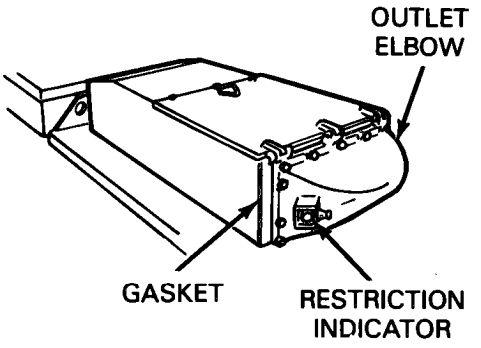
Symptom 16.4

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

3 Check air cleaner outlet elbow.

- Check elbow for holes or cracks.
- Check for presence of gasket between housing and elbow.
- Check for presence of restriction indication or plug.

Is air cleaner elbow serviceable?



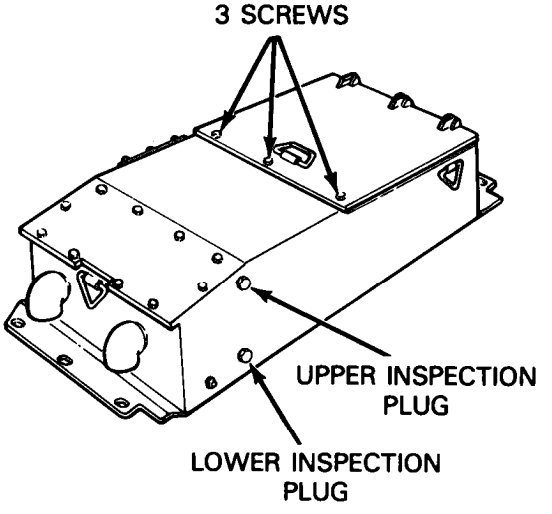
YES / NO

4 Check air cleaner housing.

- Remove lower inspection plug.
- Shine light in plug hole.
- Check precleaner for water accumulation.

Does precleaner contain water?

5 Replace air cleaner outlet elbow (page 7-101).



Symptom 16.4

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

NO / YES

6 Check air cleaner element.

- Inspect air cleaner filter element for water contamination.
- Check air cleaner filter access door gasket. Replace if damaged (page 7-128).

7 Remove upper inspection plug.

- Directing compressed air into upper inspection hole to dry.
- Service air cleaner filter element (page 7-96).
- Install upper and lower inspection plugs.

Symptom 16.5

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

POWERPLANT WARNING AND DUST DETECTOR WARNING LIGHTS ON, ONE (OR BOTH) DUST DETECTOR PRESSURE SWITCH(ES) TRIPPED, AND DUST DETECTOR FILTER STRIP IS BLACK AND WET, INDICATING CONTAMINATION OF INTAKE AIR BY OIL.

Notify direct support maintenance of defective turbosupercharger compressor shaft seal.

Symptom 16.6

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

POWERPLANT WARNING AND DUST DETECTOR WARNING LIGHTS ARE ON (ENGINE RUNNING - ALL GAGES READ NORMAL).

1 **Check dust detector pressure switch(es) for tripped condition.**

- Open top deck grille doors (TM 5-5420-202-10).
- Check dust detector switch(es).

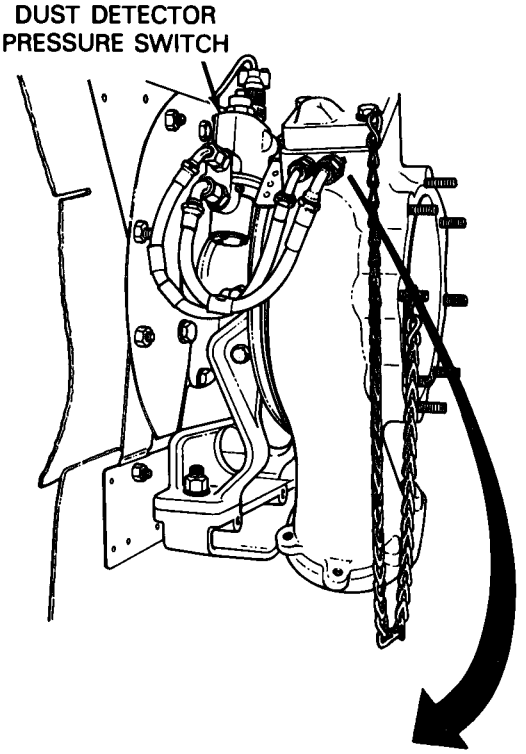
Is dust detector pressure switch(es) tripped?

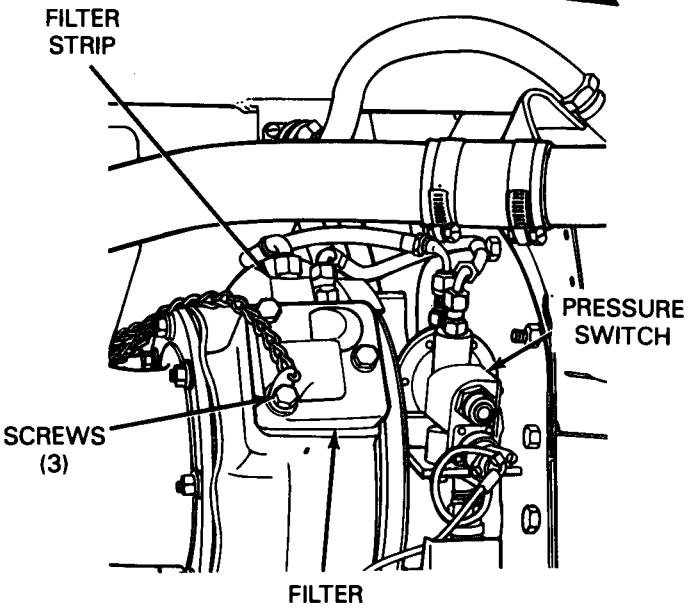
NO → **2** **Go to symptom 16.8.**

YES → **3** **Check filter strip on dust detector.**

- Loosen three screws.
- Pull out approximately three inches of filter strip.
- Cut filter strip, leaving approximately one inch sticking out of filter.
- Tighten three screws.

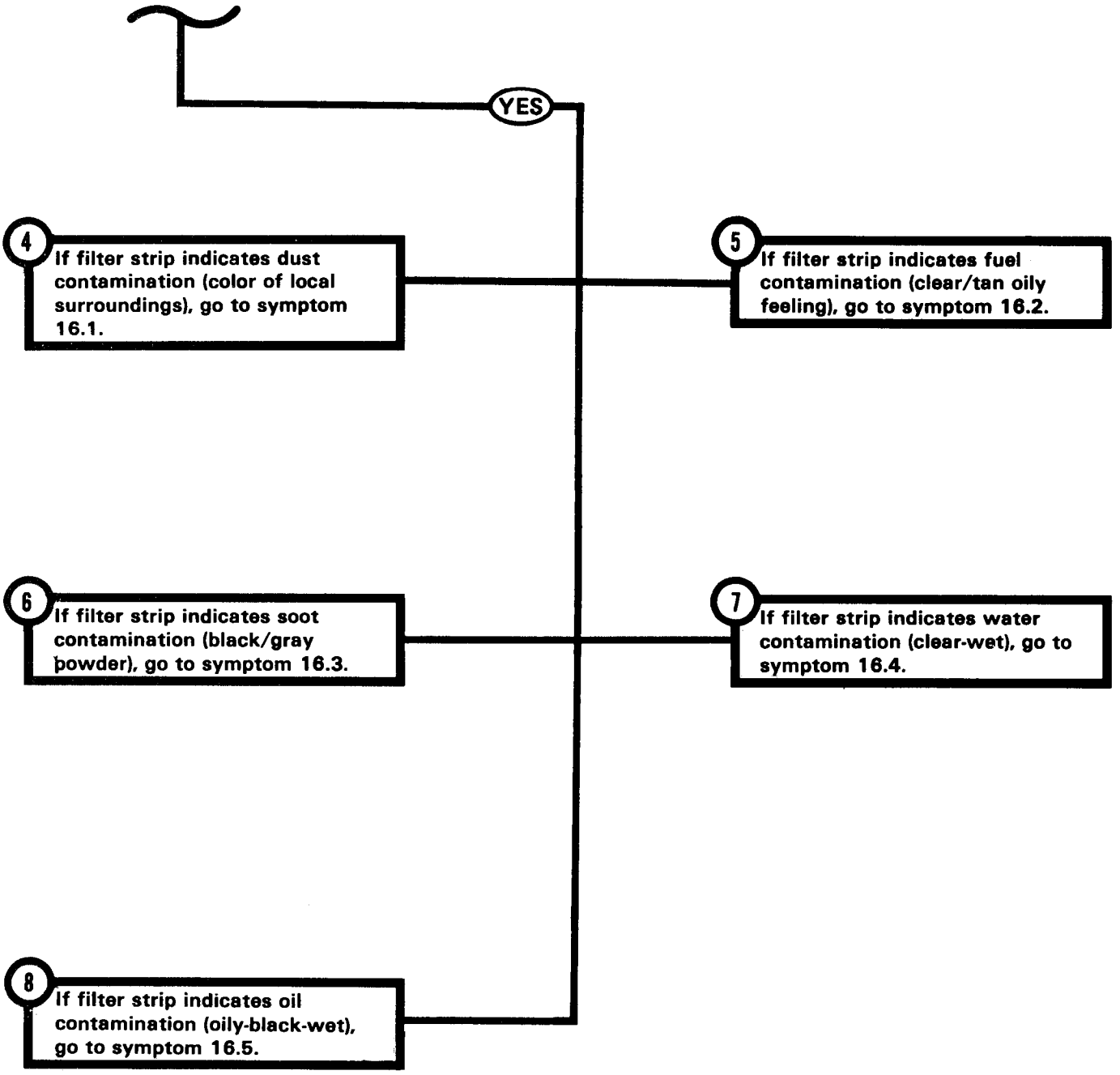
Does filter strip indicate contamination?





Symptom-16.6

DETAILED TROUBLESHOOTING PROCEDURE
TANK OPERATION - POWERPLANT, RUNNING
(Continued)



Symptom 16.7

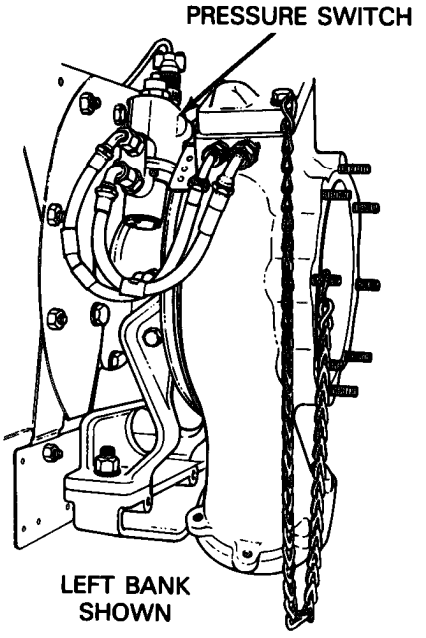
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

POWERPLANT WARNING AND DUST DETECTOR WARNING LIGHT ON, ONE (OR BOTH) DUST DETECTOR PRESSURE SWITCH(ES) TRIPPED, BUT DUST DETECTOR FILTER STRIP DOES NOT INDICATE CONTAMINATION OF INTAKE AIR.

1 **Check dust detector pressure switch(es).**

- Press plastic cap on pressure switch to reset switch(es).
- Perform engine stall test (page 5-33).
- Check indicators on pressure switch(es).

Is dust detector pressure switch(es) tripped?



YES / **NO**

NO → **Return vehicle to service.**

YES → **2**

- Service dust detector filter strip(s) (page 7-130.14).
- Perform dust detector operational test (page 10-298.17).

Is dust detector pressure switch(es) tripped?

YES / **NO**

NO → **Return vehicle to service.**

YES → **3**

Replace dust detector pressure switch(es) (page 7-130.7).

Symptom 16.8

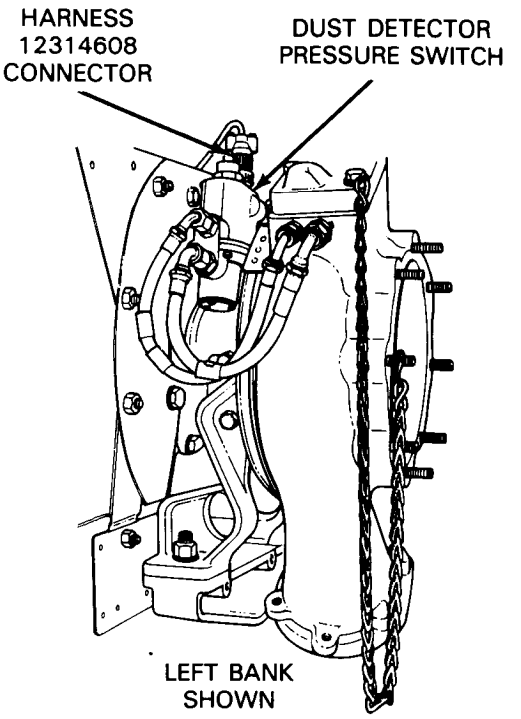
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

POWERPLANT WARNING AND DUST DETECTOR WARNING LIGHTS ON, BUT DUST DETECTOR PRESSURE SWITCH(ES) NOT TRIPPED.

1 Check pressure switches for continuity.

- Set master switch to OFF.
- Disconnect connector (P) of engine wiring harness 12314608 (circuit 510 L) from right and left dust detector pressure switches.
- Set multimeter to read ohms X1.
- Check continuity across each switch terminal.

Does continuity exist across switch terminal?



YES

2

- **Replace dust detector pressure switches (page 7-130.7).**

NO

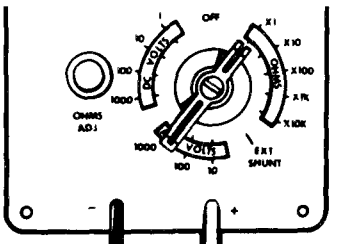
Symptom 16.8

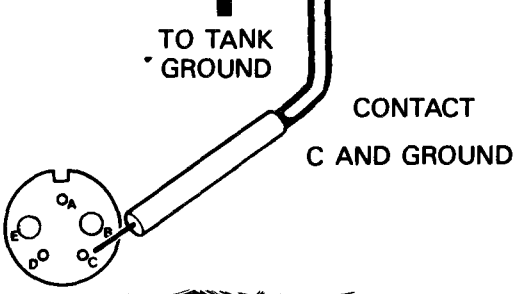
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

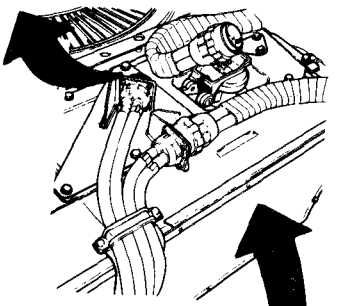
3 **Check engine wiring harness 12314608 at engine disconnect.**

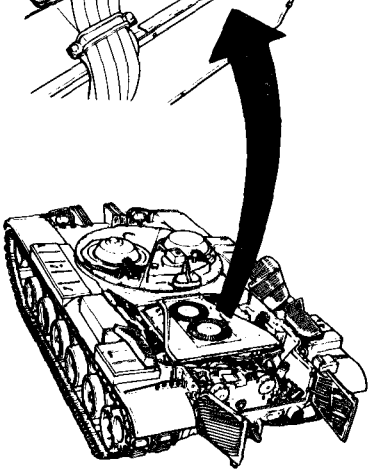
- Disconnect starter connector at engine disconnect.
- Set multimeter to read ohms X1.
- Check harness at engine disconnect by checking continuity between pin C and ground.

Does continuity exist between pin C and ground?









YES — NO

4 • **Replace engine wiring harness (page 10-298).**

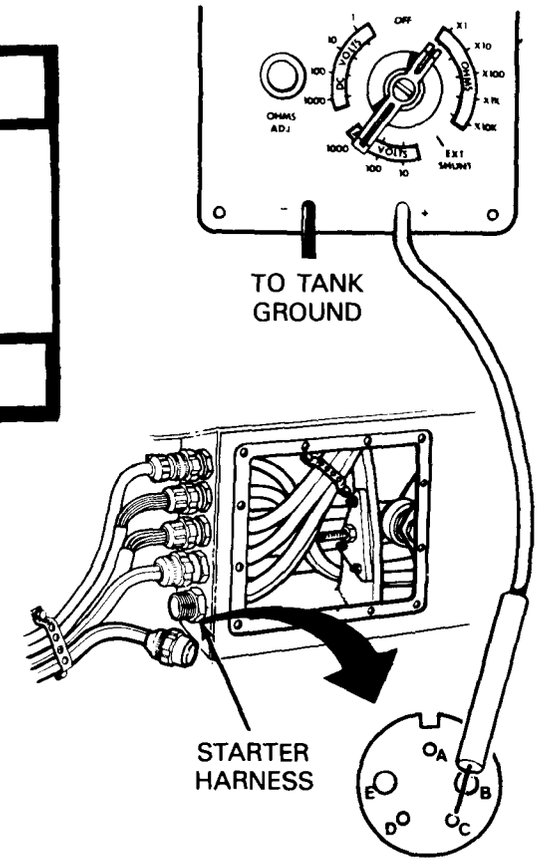
Symptom 16.8

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

5 **Check dust detector engine disconnect to bulkhead wiring harness.**

- Disconnect connectors of starter harness.
- Set multimeter to read ohms X1.
- Measure continuity between connector C and ground.

Does continuity exist between connector C and ground?



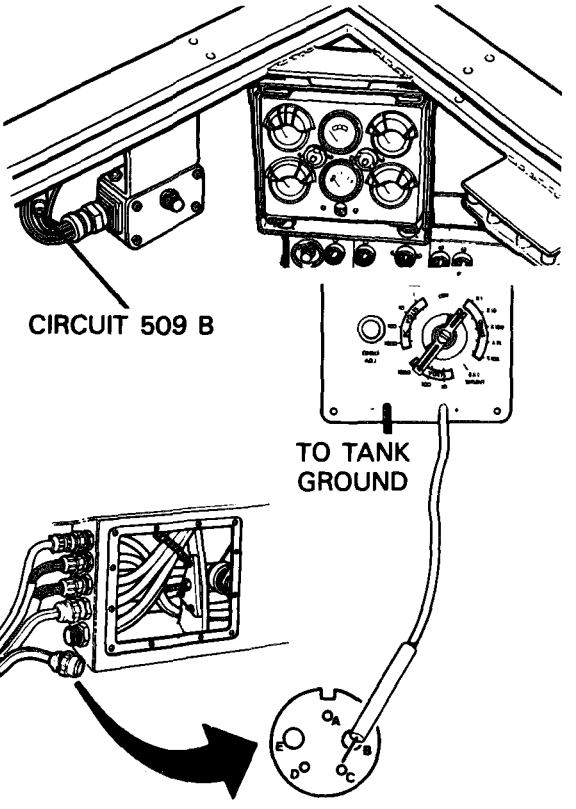
YES

NO

6 **Notify support maintenance to replace starter feed harness assembly.**

Symptom 16.8

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)



7 **Check bulkhead to dust detector warning box lead (12325928).**

- Disconnect dust detector lead assembly connector (circuit 509 B) at dust detector warning light box.
- Set multimeter to read ohms X1.
- Measure continuity between connector C and ground.

Does continuity exist between pin C and ground?

NO

8
- Replace dust detector warning light box assembly (page 10-298.14).
- Connect all harness connectors that were disconnected.

YES

9
- Replace dust detector hull intermediate lead assembly (page 10-298.8).
- Connect all harness connectors that were disconnected.

Symptom 16.9

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

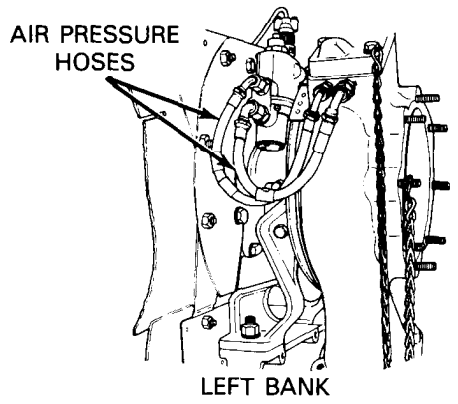
POWERPLANT WARNING AND DUST DETECTOR WARNING LIGHTS NOT ON. DUST DETECTOR PRESSURE SWITCH(ES) NOT TRIPPED. DUST INGESTION IS APPARENT BY OIL SAMPLE ANALYSIS OR DUST TRAILS.

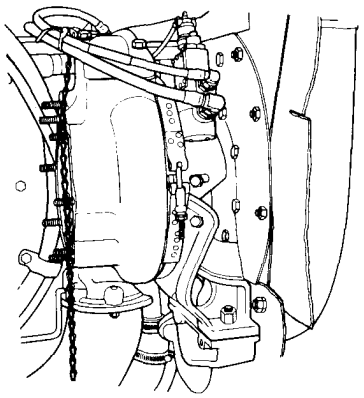
1 Service dust detector filter strip (page 7-130.14).

2 Check air pressure hoses on both sides of engine.

- Check air pressure hoses for cracks, breaks, and proper connections.
- Remove air pressure hoses and check for blockage (page 7-130.16).

Is any air pressure hose(s) damaged, blocked or improperly connected?





YES

3
- Replace any defective air pressure hose(s) (page 7-130.17).
- Install any serviceable hoses (page 7-130.17).
- Check for proper connection (page 7-130.17).

NO

4
- Install air pressure hoses (page 7-130.17).
- Perform dust detector operational test (page 10-298.17).

Are dust detector pressure switches serviceable?

NO

5 Replace dust detector pressure switch(es) (page 7-130.8).

YES

6
- Change engine oil and filter (LO 5-5420-202-10).
- Run engine 10 hours, sample oil and submit to AOAP laboratory.

Symptom 16.10

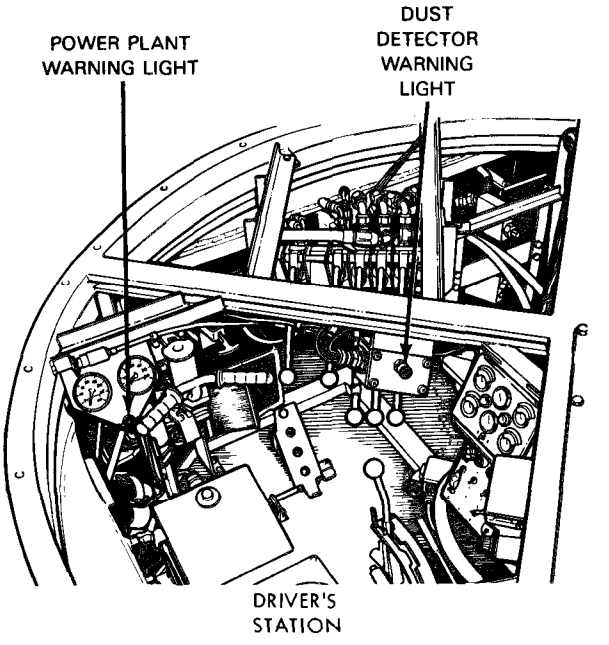
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

POWERPLANT WARNING LIGHT ON, DUST DETECTOR WARNING LIGHT OFF, DUST DETECTOR PRESSURE SWITCH(ES) TRIPPED, ENGINE RUNNING.

1 Check dust detector warning light box.

- Shut down engine.
- Press dust detector warning light to test.

Does dust detector warning lamp light?



YES

2
- **Replace dust detector warning light box (page 10-298.14).**

NO

3
- **Replace lamp (TM 5-5420-202-10).**
- **Press dust detector warning light to test.**

Does dust detector warning lamp light?

Symptom 16.10

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

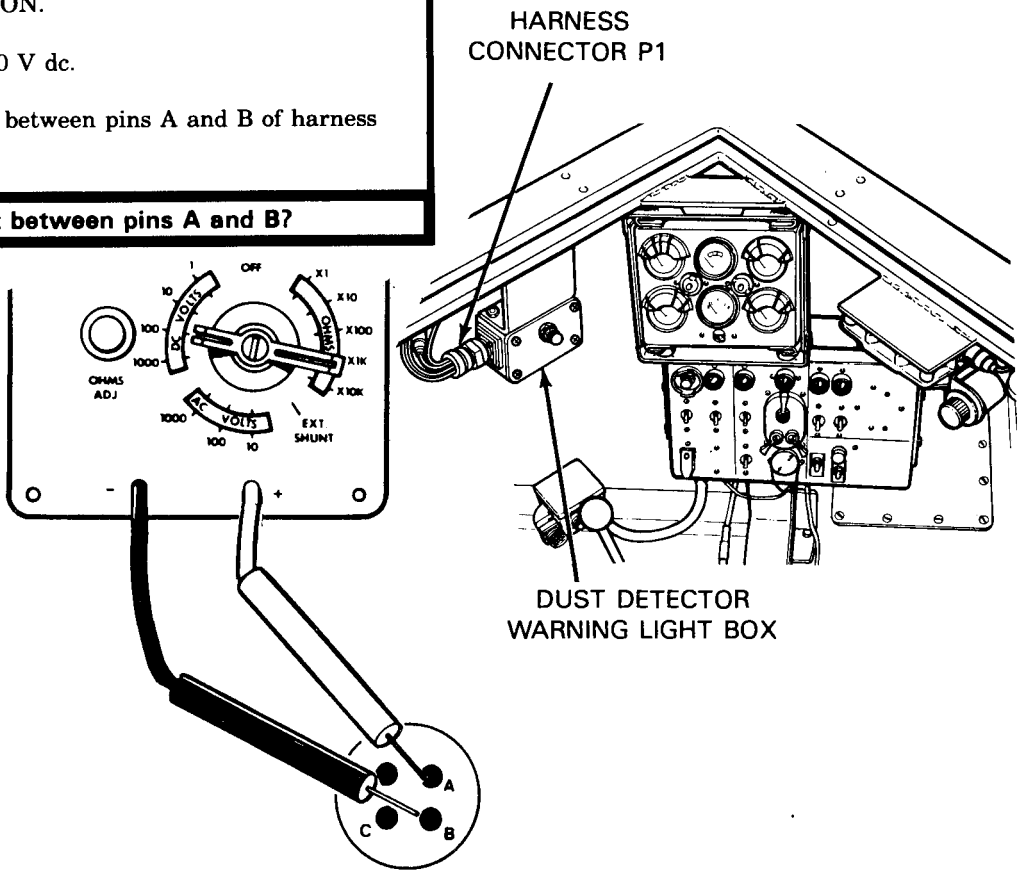
NO / YES

4 **Check dust detector warning light harness 12325927 for 18-30 volts dc.**

- Set master switch to OFF.
- Disconnect harness connector P1 at dust detector warning light box.
- Set master switch to ON.
- Set multimeter to 100 V dc.
- Check for 18-30 V dc between pins A and B of harness connector P1.

Does 18-30 V dc exist between pins A and B?

5 **Return vehicle to service.**



NO / YES

6 **Replace dust detector warning light box (page 10-298.14).**

7 **Replace dust detector warning light harness assembly (page 10-298.12).**

Symptom 16.11

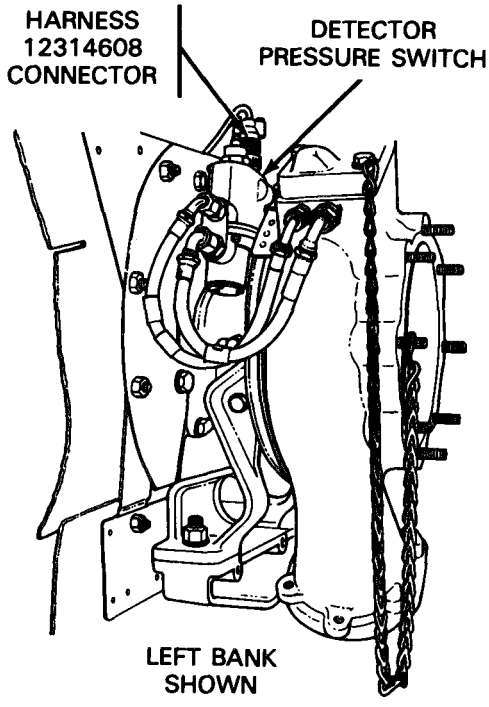
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

DUST DETECTOR PRESSURE SWITCH(ES) TRIPPED, BUT DUST DETECTOR WARNING LIGHT AND POWERPLANT WARNING LIGHT DO NOT COME ON WHEN ENGINE IS RUNNING.

1 Check pressure switches for continuity.

- Set master switch to OFF.
- Disconnect connector of engine wiring harness 12314608 (circuit 510 L) from right and left dust detector pressure switches.
- Set multimeter to read ohms X1.
- Check for continuity across each switch terminal.

Does continuity exist across switch terminal?



NO

2 Replace dust detector pressure switch(es) (page 7-130.7).

YES

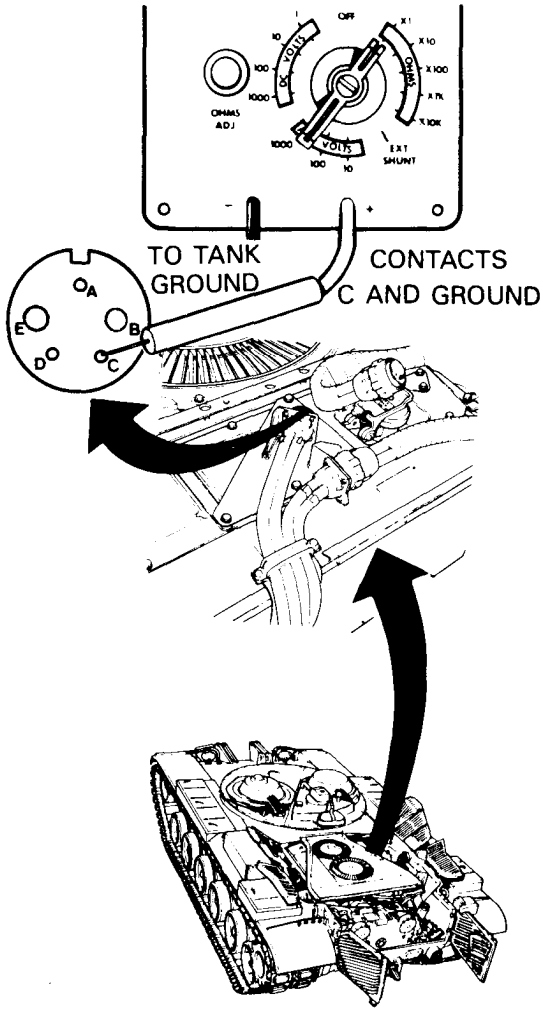
Symptom 16.11

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

3 **Check engine wiring harness at engine disconnect.**

- Disconnect starter feed harness engine disconnect.
- Connect pressure switch connectors to switch(es).
- Set multimeter to read ohms X1.
- Check harness at engine disconnect by checking continuity between pin C and ground.

Does continuity exist between pin C and ground?



NO → **4** **Replace engine wiring harness (page 10-298).**

YES

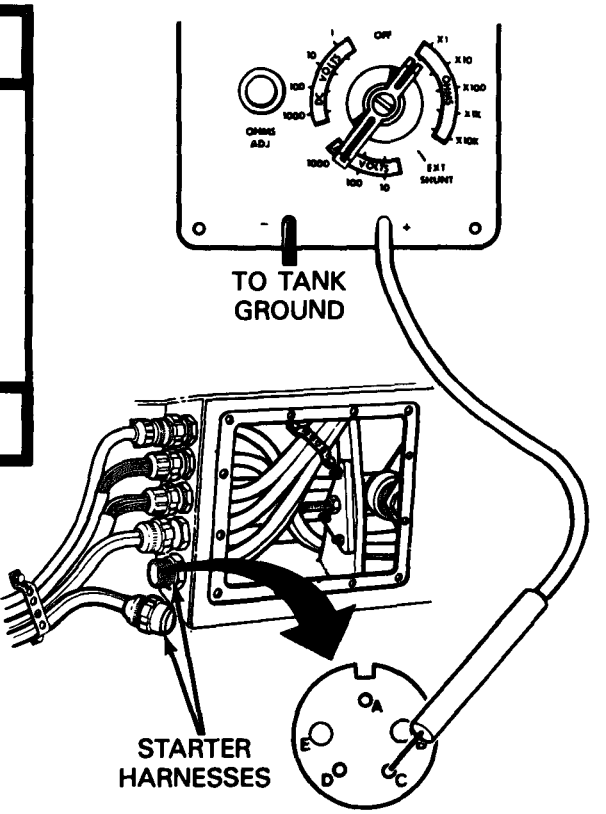
Symptom 16.11

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

5 **Check dust detector engine disconnect to bulkhead wiring harness.**

- Connect cable at engine.
- Disconnect connectors of starter harness at bulkhead disconnect.
- Set multimeter to read ohms X1.
- Measure continuity between connector C and ground.

Does continuity exist between connector C and ground?



NO → **6** **Notify support maintenance to replace starter feed harness assembly.**

YES

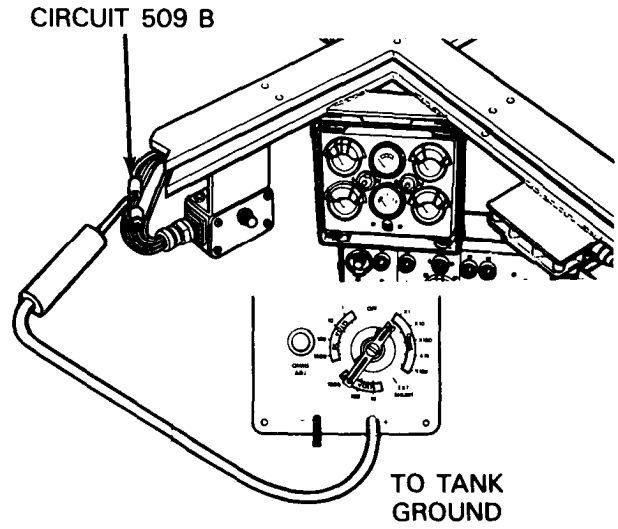
Symptom 16.11

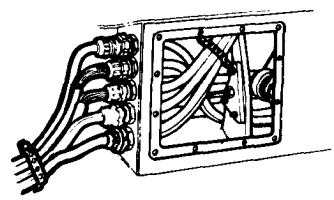
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

7 **Check hull intermediate lead assembly.**

- Connect starter cable at bulkhead.
- Disconnect dust detector lead assembly connector (circuit 509 B) at dust detector warning light box.
- Set multimeter to read ohms X1.
- Measure continuity between dust detector lead assembly connector and ground.

Does continuity exist between lead and ground?





NO

8
- **Replace dust detector hull intermediate lead assembly (page 10-298.8).**
- **Connect all harness connectors that were disconnected.**

YES

9
- **Replace dust detector warning light box assembly (page 10-298.14).**
- **Connect all harness connectors that were disconnected.**

Symptom 16.12

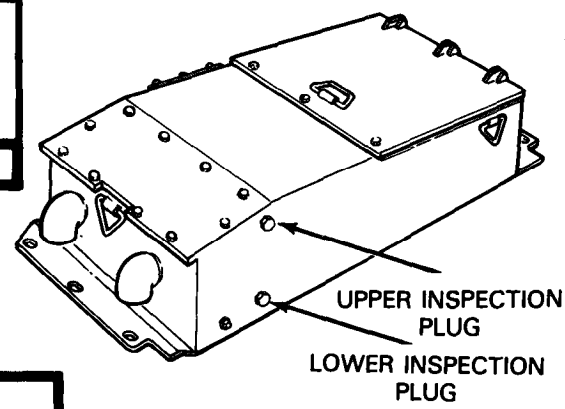
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

LOW POWER, EXCESSIVE BLACK SMOKE, ONE OR BOTH FILTERS REQUIRE FREQUENT CLEANING.

1 Inspect air cleaner section for accumulation of foreign matter.

- Remove inspection plugs.
- Shine light into lower inspection hole.

Does pre-cleaner section contain foreign matter?



NO — YES

2 Inspect air cleaner filter element access door gasket.

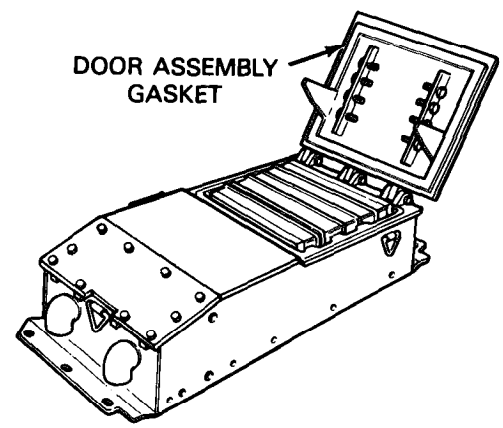
Open air cleaner door (page 7-128) and inspect gasket for dust leakage (page 7-129).

Is door gasket leaking?

YES — NO

3 Replace door gasket (page 7-128).

4 Replace air cleaner filter element (page 7-96).



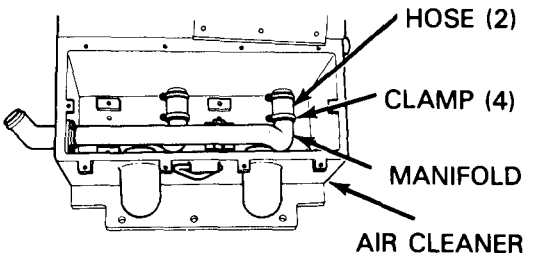
Symptom 16.12

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

5 **Clean pre-cleaner section of air cleaner.**

Check for loose or missing VEDES components.

Are hose clamps loose or any VEDES components missing?



YES — NO

6
- **Tighten or replace loose or missing hose clamps or VEDES components.**

7 **Inspect VEDES scavenger tubes and hoses for damage.**

- Inspect tubes for dents or cracks.
- Inspect hoses for cuts or tears.

Are any VEDES scavenger tubes or hoses damaged?

YES — NO

8 **Replace damaged scavenger tubes or hoses (page 8-17).**

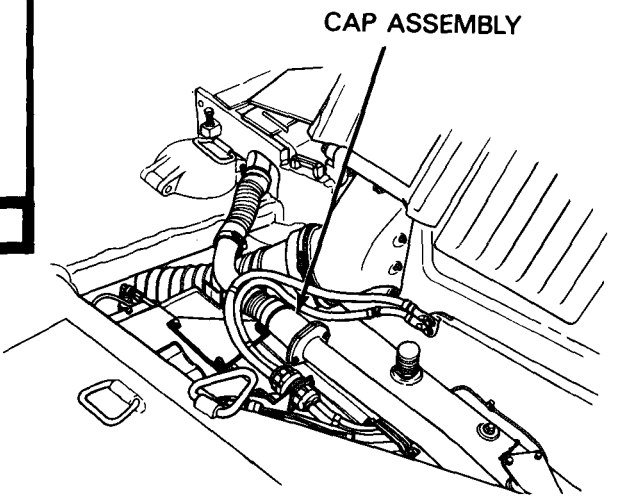
Symptom 16.12

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

9 **Check cap assembly (check valve) for proper operation.**

- Remove cap assembly (check valve) (page 8-14).
- Tilt cap assembly (check valve) side to side to verify flapper is free.
- Look inside cap assembly (check valve) to see that flapper is not damaged or missing.

Is cap assembly (check valve) operating properly?



YES / NO

10
- **Install cap assembly (check valve) (page 8-16).**
- **Remove and inspect scavenger tubes, hoses, and air cleaner manifold for obstruction (page 8-17).**

Are scavenger tubes, hoses, or manifold obstructed?

YES / NO

11
- **Replace cap assembly (check valve) (page 8-14).**

12 **Clean/replace obstructed scavenger tubes/hoses and manifold (page 8-17).**

13 **Replace exhaust ejector tubes (page 8-21 or 8-25).**

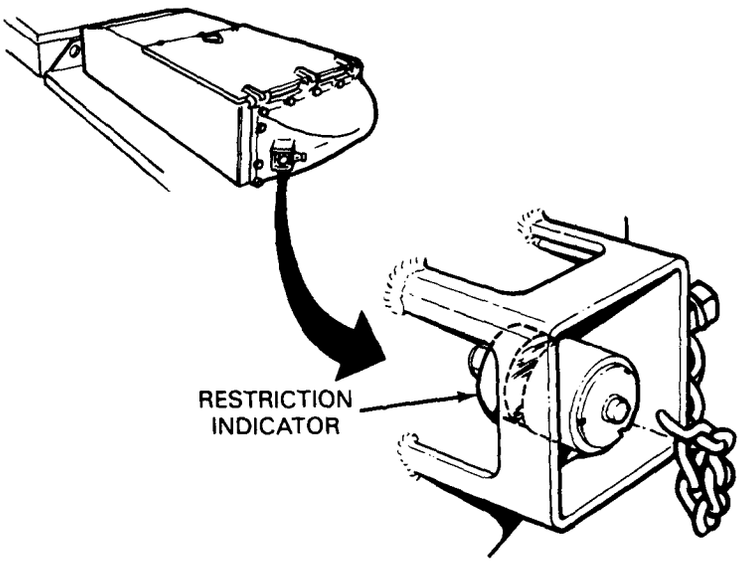
Symptom 16.13

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

LOW POWER, EXCESSIVE BLACK SMOKE.

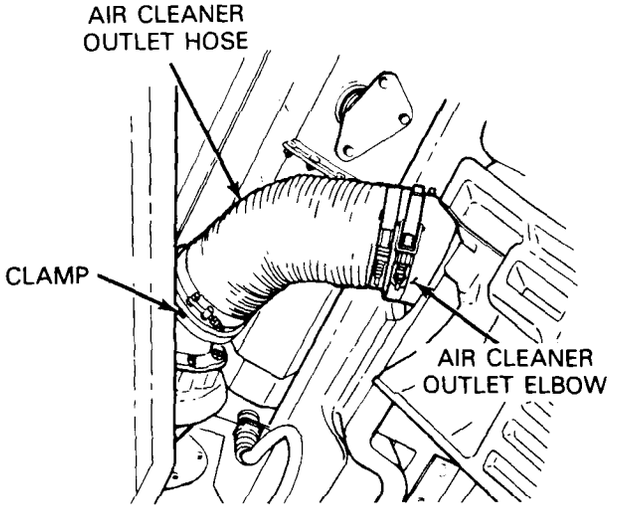
1 • **Check right and left restriction indicators and note reading.**

Does indicator read 30 or more?



YES **NO**

2 **Service air cleaner filter elements on both sides of tank (page 7-96).**



3 **Check air cleaner outlet hoses.**

- Open top deck grille doors.
- Inspect air cleaner outlet hoses.

Is either air cleaner outlet hose damaged?

Symptom 16.13

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, RUNNING
(Continued)

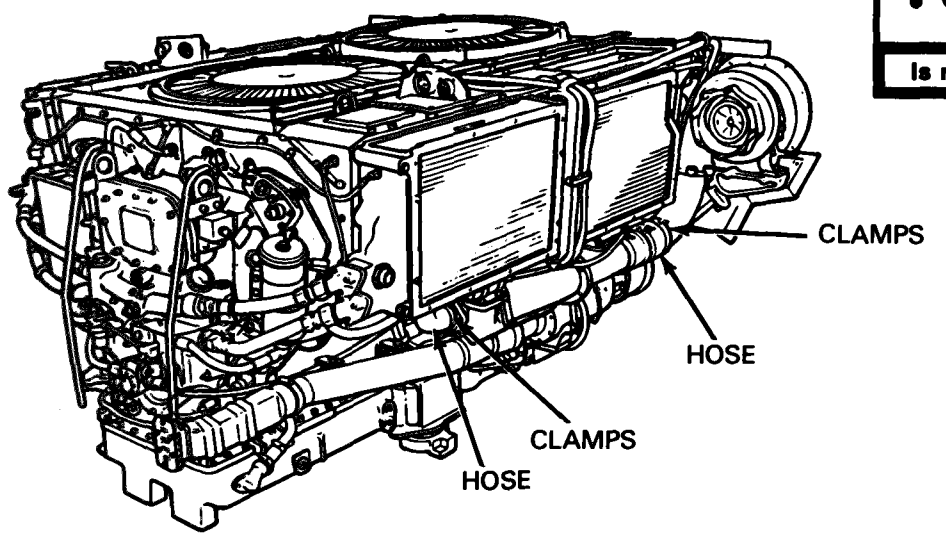
YES / NO

4 Replace air cleaner outlet hose(s) (page 7-84).

5 Check engine intake manifold for leaks.

- Check all hoses for cuts or tears.
- Check clamps for security.
- Check tubes for cracks.

Is manifold leaking?



YES / NO

6 Notify direct support.

7 Go to symptom 11-2D, step 3 (page 4-259).

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING

Symptom-17

ENGINE FUEL SHUT OFF SWITCH WILL NOT STOP ENGINE.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check front accessory harness connector (CKT 54A at bulkhead disconnect for electrical power.

First Technician (Commander's Station)

- Displace front accessory harness connector (CKT 54A) from bulkhead disconnect (page 10-269).
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact B (CKT 54A) of front accessory harness connector and black probe to ground.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Momentarily set ENGINE FUEL SHUT OFF switch in up position, then release it.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc while switch is in up position.

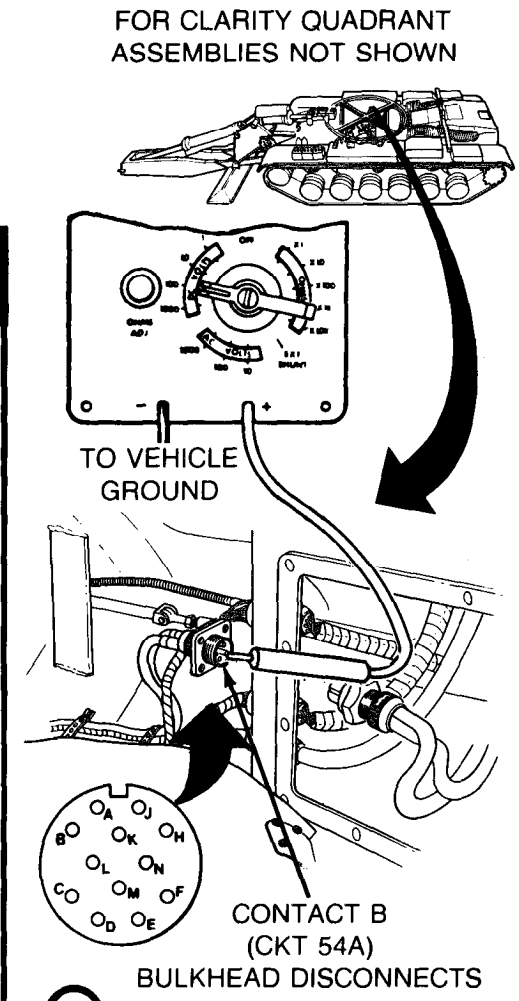
Does meter indicate 18 to 30 volts dc?

YES

NO

2

- **Check basket-control panel starting harness connector (CKT 54A) at basket disconnect for electrical power.**
- **See Step (10) .**



TA250192

Symptom-17

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING
(Continued)

3 Check bulkhead engine disconnect harness (CKT 54A) at engine disconnect for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Install front accessory harness connector to bulkhead disconnect (page 10-270).

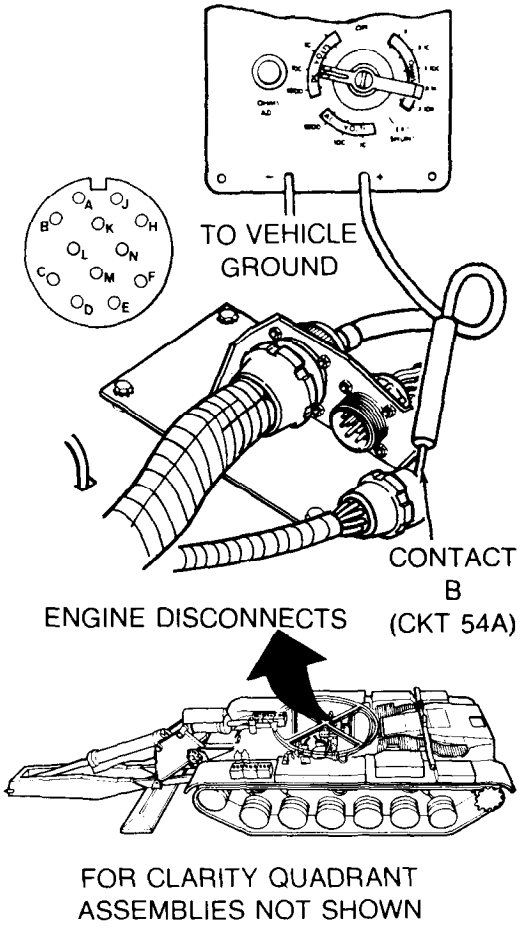
First Technician (Left Top Deck Grille Doors)

- Open left top deck grille doors to gain access to engine disconnect.
- Disconnect bulkhead engine disconnect harness (CKT 54A) from engine disconnect.
- Connect red probe of meter to contact B (CKT 54A) of bulkhead engine disconnect harness connector and black probe to ground.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Momentarily set ENGINE FUEL SHUT OFF switch in up position, then release it.

First Technician (Left Top Deck)



TA250193

Symptom-17

DETAILED TROUBLESHOOTING PROCEDURE

STEP (3) CONTINUED **VEHICLE OPERATION - POWERPLANT, STOPPING (Continued)**

- Check if meter indicates 18 to 30 volts dc while switch is in up position.

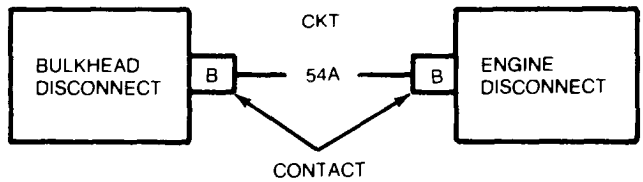
Does meter indicate 18 to 30 volts dc?

YES

NO

(4)

- **Inspect bulkhead engine disconnect harness for bent/ broken connector contacts or loose CKT 54A wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of defective bulkhead engine disconnect harness.**
- **Connect bulkhead engine disconnect harness connector to engine disconnect.**



TA250194

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING
(Continued)

Symptom-17

5 **Check engine electrical harness (CKT 54A) at front of engine for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Left Top Deck)

- Connect bulkhead engine disconnect harness to engine disconnect.

First Technician (Rear of Crew Compartment)

- Remove engine upper access cover (page 17-11).
- Disconnect engine electrical harness (CKT 54A) from fuel shut off solenoid lead connector.
- Connector red probe of meter to center contact of engine harness connector (CKT 54A), and black probe to ground.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Momentarily set ENGINE FUEL SHUF OFF switch in up position, then release it.

First Technician (Rear of Crew Compartment)

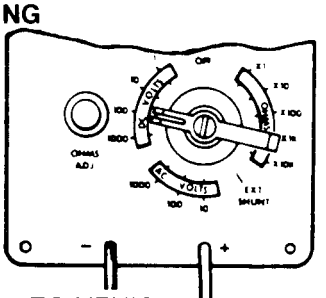
- Check if meter indicates 18 to 30 volts dc while switch is in up position.

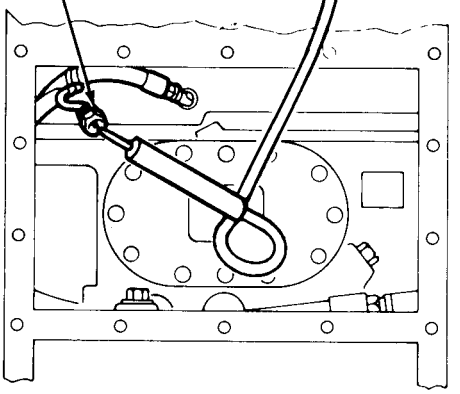
Does meter indicate 18 to 30 volts dc?

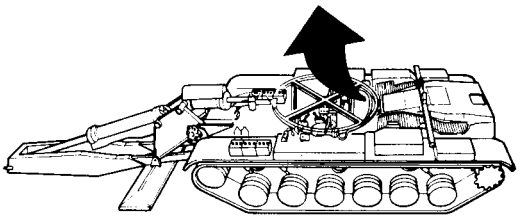
YES

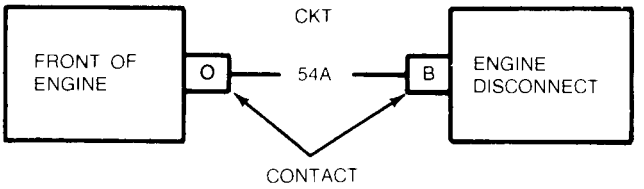
NO

6 **Repair engine electrical harness (page 10-298).**









TA250195

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING
(Continued)

Symptom-17

7 **Check fuel shut off solenoid lead (CKT 54A) at fuel shut off solenoid for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Rear of Crew Compartment)

- Reconnect engine electrical harness (CKT 54A) to fuel shut off solenoid lead connector.

First Technician (Top Deck)

- Have top deck removed (page 16-21).
- Remove front engine cooling fan (page 9-55).

First Technician (Engine)

- Disconnect fuel shutoff solenoid electrical lead (CKT 54A) from fuel shut off solenoid.
- Connect red probe of meter to center contact of solenoid electrical lead connector and black probe to ground

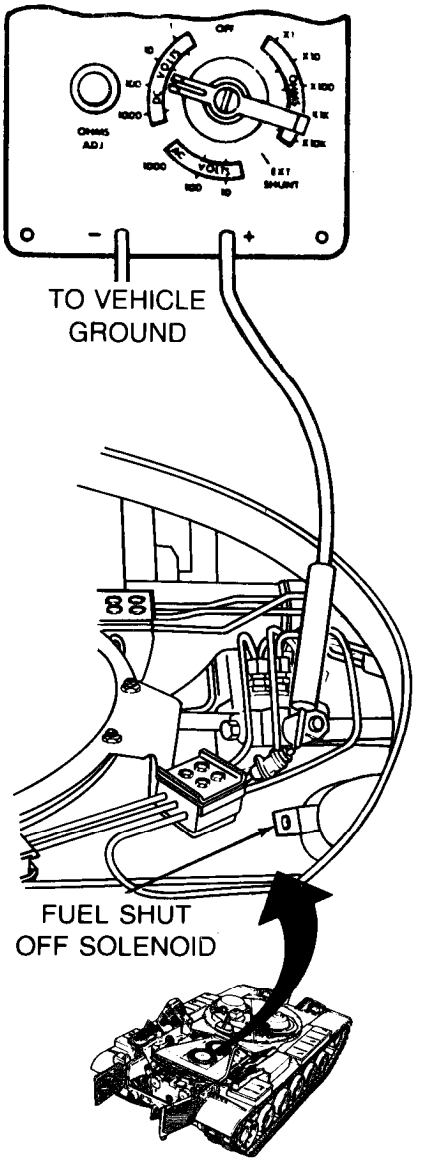
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Momentarily set ENGINE FUEL SHUT OFF switch in up position, then release it.

First Technician (Top Deck)

- Check if meter indicates 18 to 30 volts dc while switch is in up position.

Does meter indicate 18 to 30 volts dc?



8 **Replace fuel shut off solenoid lead (page 20-27).**

NO

YES

9 **Notify support maintenance of defective fuel shut off solenoid/ fuel injection pump.**

TA250196

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING
(Continued)

SYMPTOM-17
FROM STEP 2

10 **Check front accessory harness (CKT 54A) from connector at bulkhead disconnect to connector at basket disconnect for continuity.**

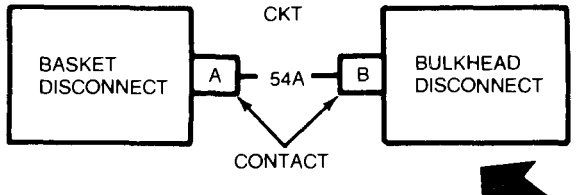
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

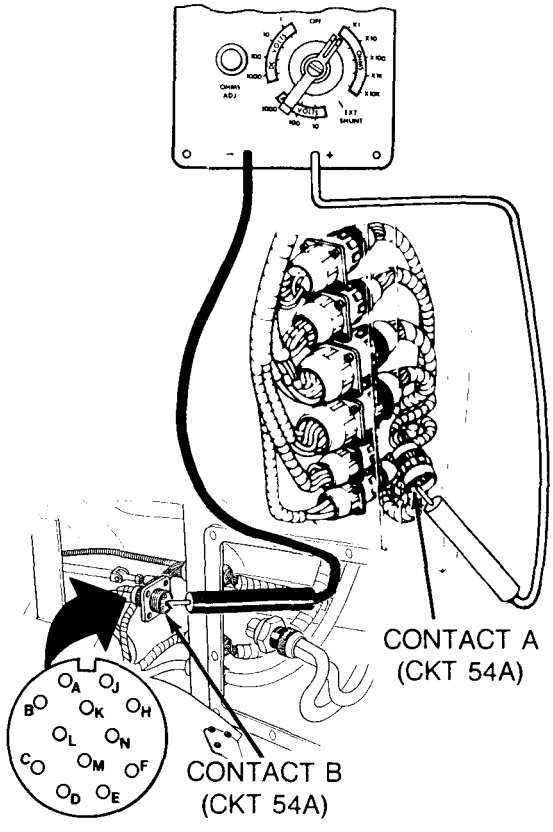
- Disconnect front accessory harness connector (CKT 54A) at basket disconnect.
- Set multimeter to OHMS X1 scale and zero meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact A (CKT 54A) of front accessory harness connector at basket disconnect.
- Connect black probe of meter to contact B (CKT 54A) of front accessory harness connector at bulkhead disconnect.
- Check if meter indicates continuity.

Does meter indicates continuity?



YES

NO



11

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 54A wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Connect front accessory harness connector at basket disconnect.**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**

TA250197

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING
(Continued)

Symptom-17

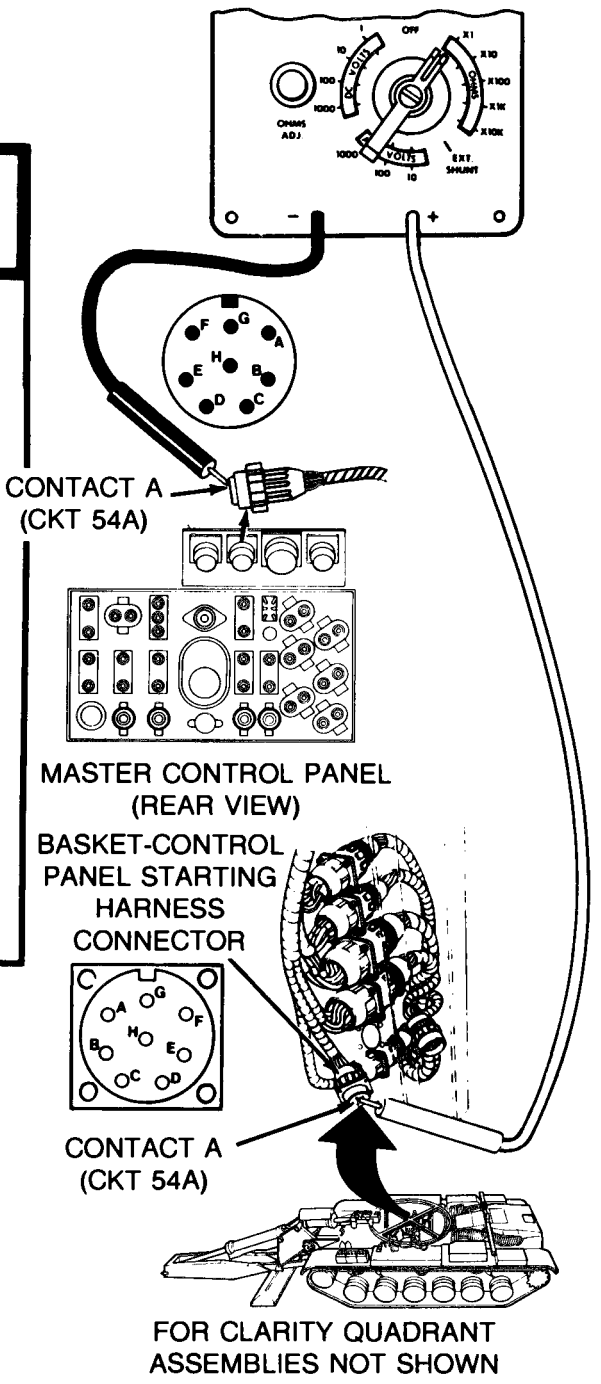
12 **Check basket-control panel starting harness (CKT 54A) for continuity.**

First Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).
- Displace basket-control panel starting harness connector at basket disconnect.
- Connect red probe of meter to contact A (CKT 54A) of basket-control panel starting harness connector at basket disconnect.

Second Technician (Operator's Station)

- Displace master control panel (page 10-33).
- Disconnect basket-control panel starting harness connector from master control panel.
- Connect black probe of meter to contact A (CKT 54A) of basket-control panel harness connector at master control panel.



TA250198

Symptom-17

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING
(Continued)

STEP (12) CONTINUED

First Technician (Commander's Station)

- Check if meter indicates continuity.

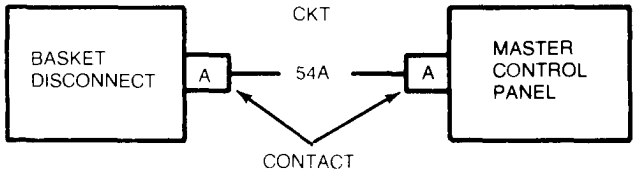
Does meter indicate continuity?

YES

NO

(13)

- **Inspect basket-control panel starting harness for bent/ broken connector contacts or loose CKT 54A wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-control panel starting harness.**
- **Install basket-control panel starting harness connector at basket disconnect (page 10-270).**
- **Connect basket-control panel starting harness connector to master control panel.**
- **Install master control panel (page 10-33).**



TA250199

Symptom-17

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING
(Continued)

14 **Check ENGINE FUEL SHUT OFF switch for continuity.**

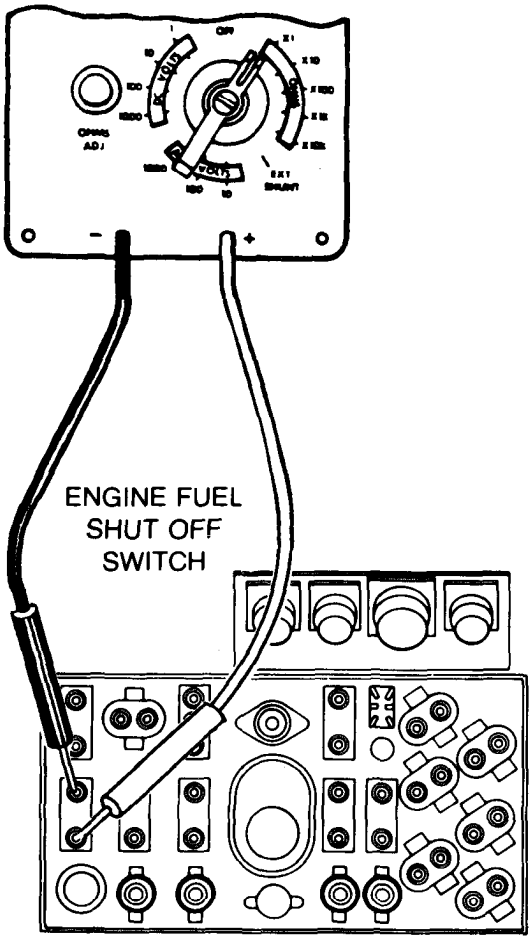
First Technician (Commander's Station)

- Install basket-control panel starting harness connector at basket disconnect.

Second Technician (Operator's Station)

- Connect basket-control panel starting harness connector to master control panel.
- Disconnect two connectors (CKT 54 and 54A) from ENGINE FUEL SHUT OFF switch.
- Connect red probe of meter to one contact of ENGINE FUEL SHUT OFF switch.
- Connect black probe of meter to other contact of ENGINE FUEL SHUT OFF switch.
- Momentarily set ENGINE FUEL SHUT OFF switch in up position, then release it.
- Check if meter indicates continuity while switch is in up position.

Does meter indicate continuity?



MASTER CONTROL PANEL
(REAR VIEW)

YES

NO

15

- **Replace ENGINE FUEL SHUTOFF switch (page 10-47).**

TA250200

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING
(Continued)

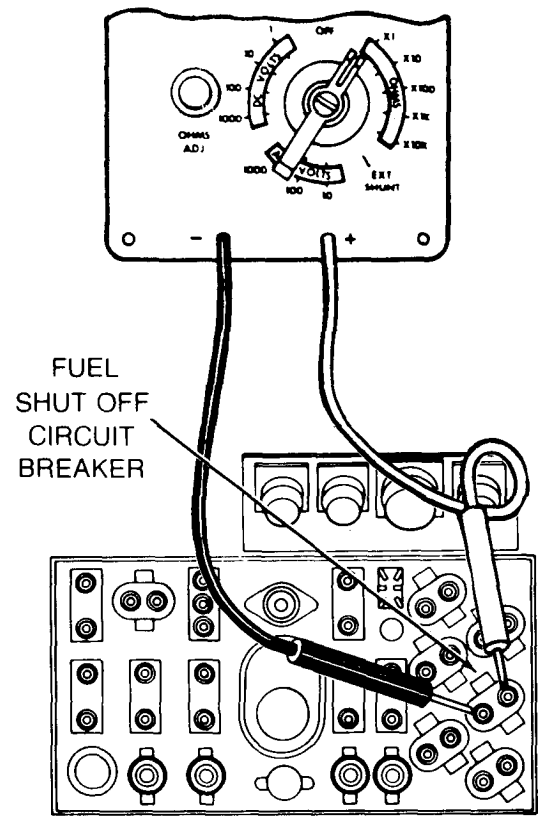
Symptom - 17

16 **Check fuel shut off circuit breaker for continuity.**

Second Technician (Operator's Station)

- Disconnect two (CKT 54) connectors from fuel shut off circuit breaker.
- Connect red probe of meter to one contact of circuit breaker.
- Connect black probe of meter to other contact of circuit breaker.
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

NO

17

- **Replace fuel shut off circuit breaker (page 10-165).**
- **Reconnect two connectors (CKT 54A and 54) to engine fuel shut off switch.**

TA250201

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING
(Continued)

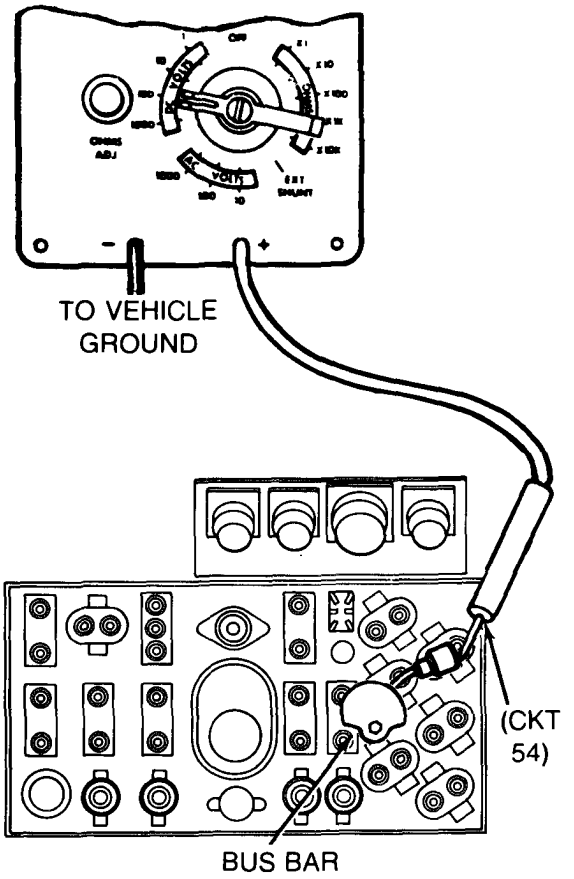
Symptom-17

18 **Check CKT 54 input to fuel shut off circuit breaker for electrical power.**

Second Technician (Operator's Station)

- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to CKT 54 connector coming from bus bar.
- Connect black probe of meter to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



YES

NO

19

- **Replace master control panel power harness (page 10-101).**
- **Connect CKT 54 and 54A to ENGINE FUEL SHUT OFF switch.**
- **Connect CKT 54 connectors to fuel shut off circuit breaker.**

TA250202

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING
(Continued)

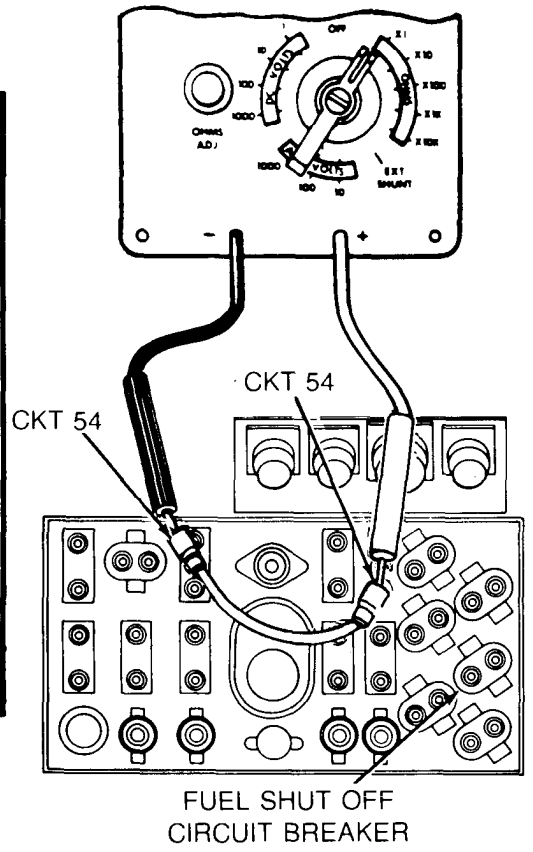
Symptom-17

20 **Check fuel shut off harness (CKT 54) for continuity from ENGINE FUEL SHUT OFF switch to fuel shut off circuit breaker.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to fuel shut off harness connector (CKT 54) at circuit breaker.
- Connect black probe of meter to fuel shut off harness connector (CKT 54) at switch.
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

22
- **Replace master control panel starting harness (page 10-97).**
- **Reconnect fuel shutoff harness (CKT 54) to circuit breaker and to ENGINE FUEL SHUT OFF switch.**
- **Reconnect master control panel power harness (CKT 54) to circuit breaker.**

NO

21
- **Replace master control panel fuel shut off harness (page 10-109).**
- **Reconnect master control panel power harness (CKT 54) to circuit breaker.**
- **Reconnect CKT 54A connector to ENGINE FUEL SHUT OFF switch.**

TA250203

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STOPPING

Symptom-18

MANUAL FUEL SHUTOFF HANDLE WILL NOT STOP ENGINE.

1 Check if clevis pin connecting fuel shutoff cable to fuel shutoff lever on engine is installed.

Technician (Rear of Crew Compartment)

- Remove upper engine access cover (page 17-11).
- Check if clevis pin connecting fuel shutoff cable to fuel shutoff lever on engine is installed.

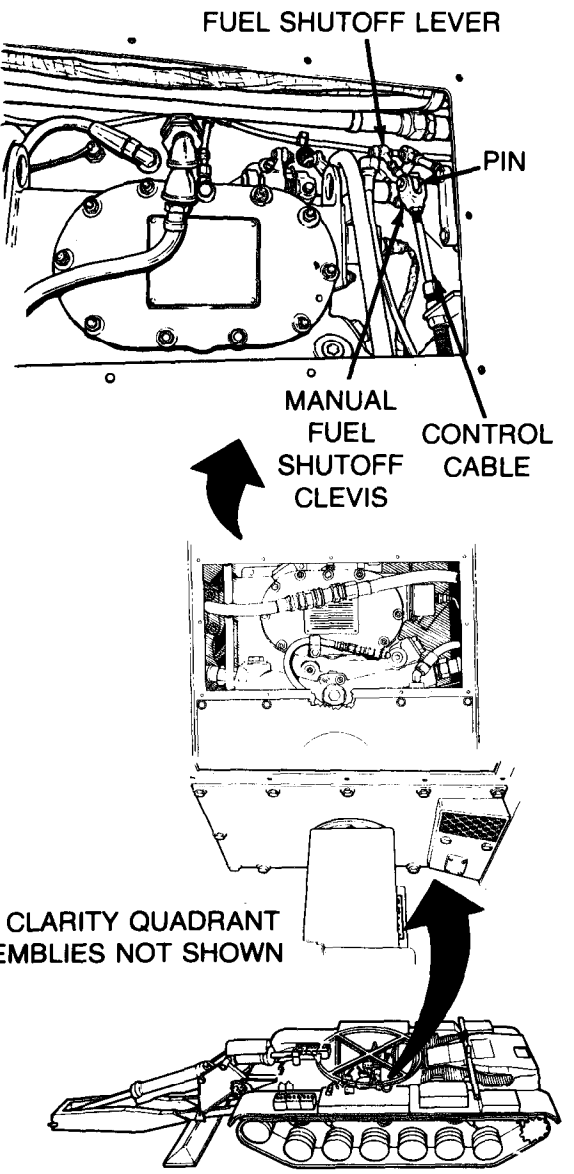
Is clevis pin installed?

YES

2
- **Install upper engine access cover (page 17-12).**
- **Notify support maintenance of fuel shutoff problem.**

NO

3
- **Install clevis pin.**



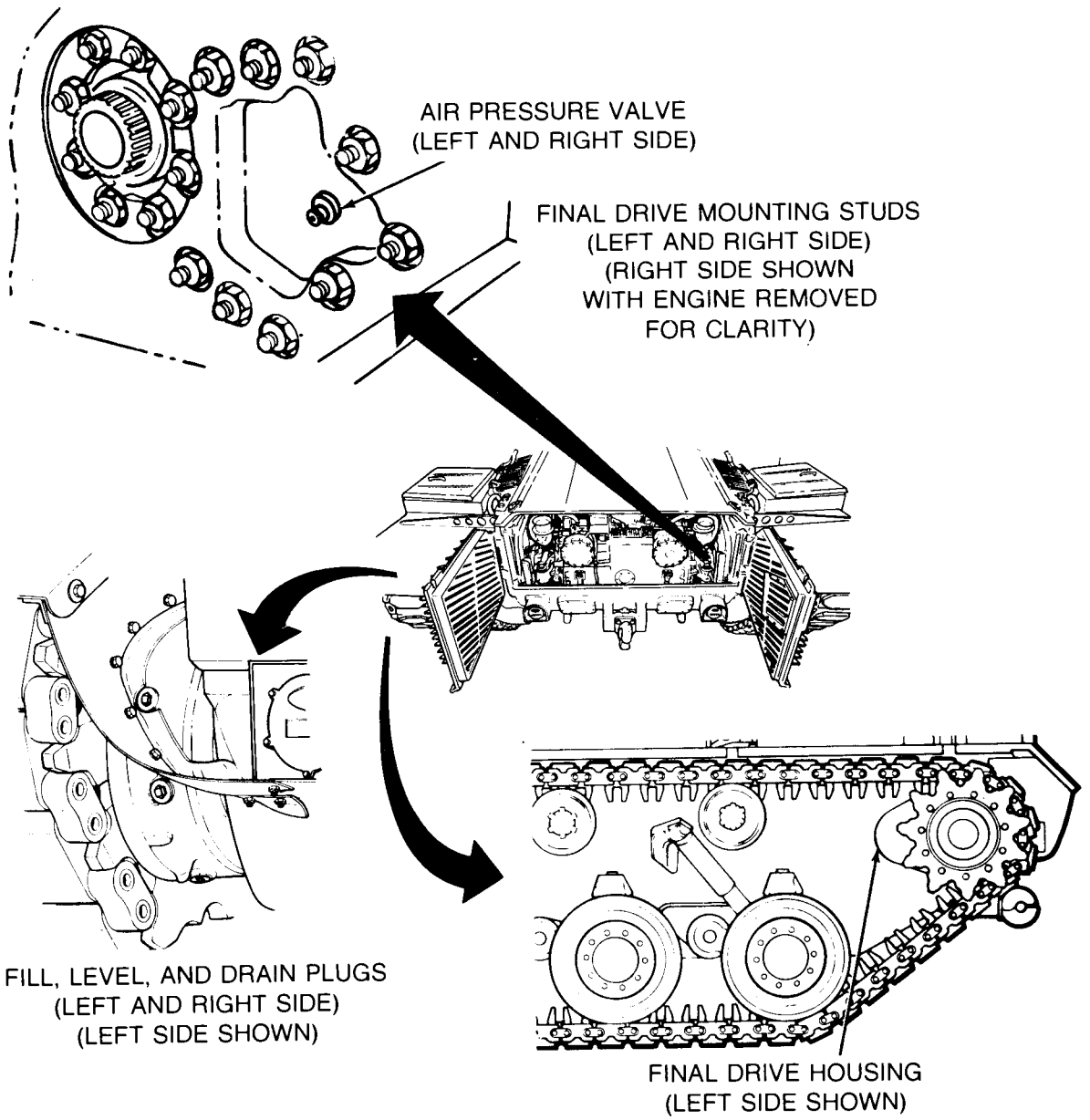
TA250204

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - FINAL DRIVE

Symptom-19

FINAL DRIVE LEAKS OIL.

LOCATOR VIEWS:



TA250205

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - FINAL DRIVE
(Continued)

Symptom-19

FINAL DRIVE LEAKS OIL

NOTE

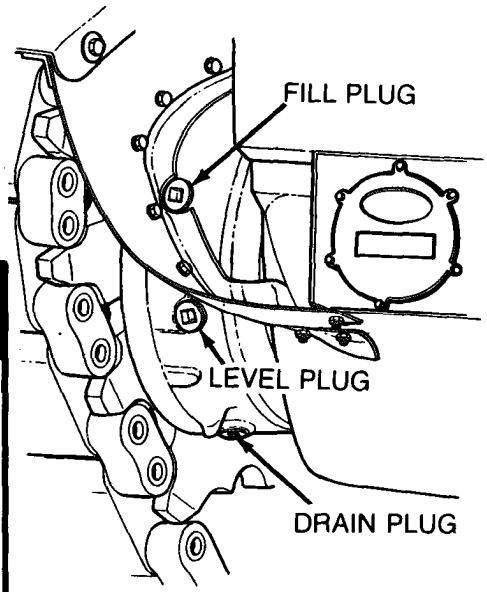
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check final drive housing for loose or missing fill, level, and drain plugs.

Both Technicians (Rear of Vehicle)

- Remove oil and dirt from rear of leaking final drive housing.
- Visually check final drive housing fill, level, and drain plugs for missing or loose plugs.

Are fill, level, and drain plugs in place and tight?



REAR OF FINAL DRIVE

NOTE
LEFT AND RIGHT FINAL DRIVE ARE THE SAME (LEFT SIDE SHOWN)

YES

NO

2

- **Tighten fill, level, and drain plugs.**
- **Replace missing or damaged fill, level, and drain plugs (page 12-9).**
- **Service final drive (LO5-5420-202-12).**

TA250206

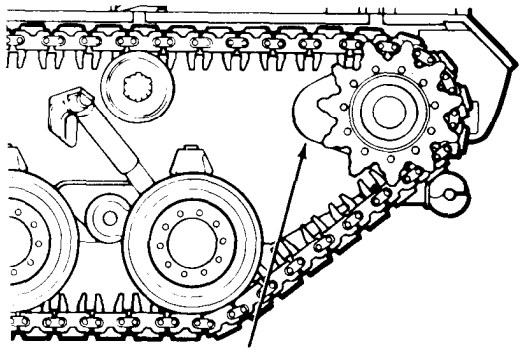
Symptom-19

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - FINAL DRIVE
(Continued)

3 **Check outside of final drive housing for cracks or other damage.**

- Be sure that entire final drive housing has been cleaned and free of oil and dirt.
- Visually check leaking final drive housing for cracks or other damage.

Is outside of final drive housing cracked or damaged?



FINAL DRIVE HOUSING

NOTE

Final drive may be equipped with an air pressure valve or vent tubing system.

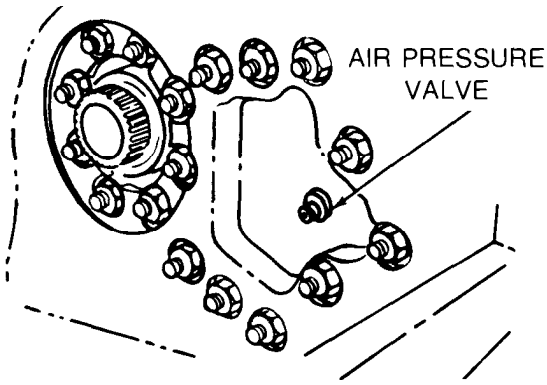
4 **Replace final drive (page 12-2).**

NO — YES

5 **Check final drive air pressure valve for operation.**

- Remove transmission shroud (page 9-2).
- Check leaking final drive air pressure valve by manually turning spring-loaded cap in one direction then in the other.

Does air pressure valve cap operate freely?



ENGINE REMOVED FOR CLARITY

6

- **Check final drive input shaft adapter seal for leaks.**
- **See step 10.**

YES — NO

7

- **Replace pressure valve (page 12-6).**
- **Service final drive (LO 5-5420-202-12).**

TA250207

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - FINAL DRIVE
(Continued)

Symptom-19

8 **Check final drive vent tubing system for damage.**

Both Technicians

- Remove transmission shroud (page 9-20).

Second Technician (Top Deck)

- Open left top deck grill doors.
- Visually check the following for damage:
  - Steel tubing (A) from fitting (B) to tee fitting (C).
  - Steel tubing (D) from tee fitting (C) to reducer fitting (E).

First Technician (Rear of Vehicle)

- Visually check the following for damage;
  - Steel tubing (F) from reducer fitting (E) to tee fitting (G).
  - Plastic tubing (H) from tee fitting (G) to elbow fitting (J).

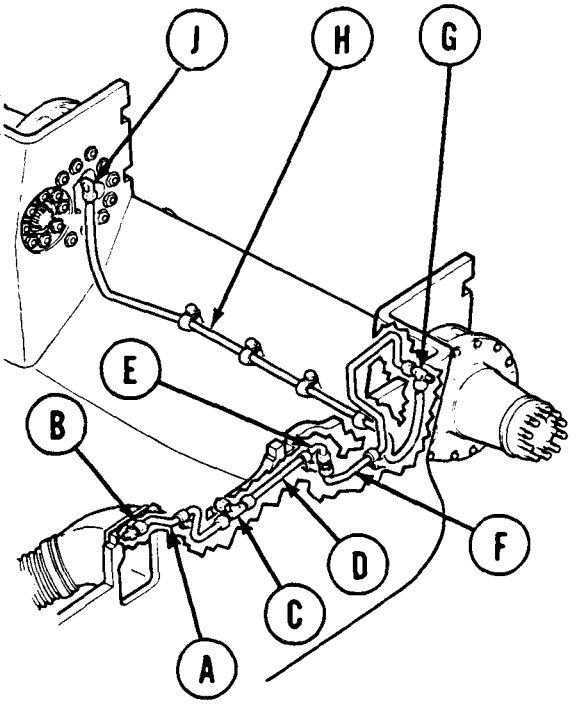
Is vent tubing or fittings, cracked, crimped, or broken?

YES

9

- **Replace damaged tubing and/or fittings.**

NO

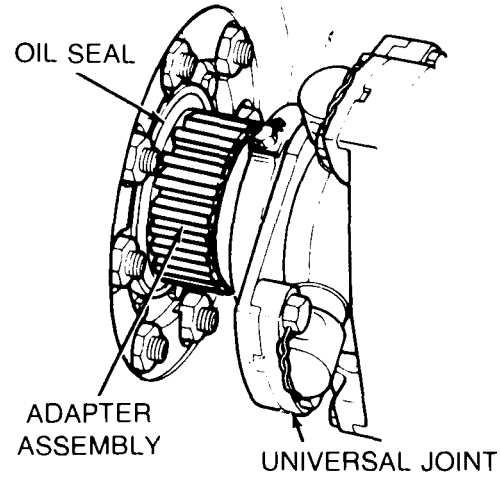


TA250208

Symptom-19

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - FINAL DRIVE
(Continued)

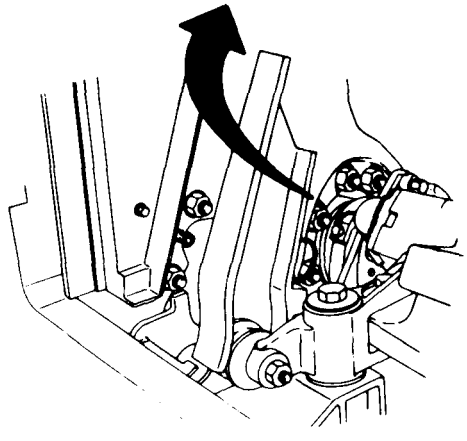
ADAPTER ASSEMBLY IS A GEAR, ONLY SEEN IF FINAL DRIVE IS DISCONNECTED FROM UNIVERSAL JOINT



10 **Check final drive input shaft adapter seal for leaks.**

- Remove input adapter assembly from leaking final drive (page 12-7).
- Check for oil leak around the input shaft oil seal of the leaking housing.

Is input shaft oil seal leaking?



NO → **12** **Replace final drive assembly (page 12-2).**

YES → **11**

- **Replace final drive input shaft oil seal (page 12-7).**
- **Service final drive LO5-5420-202-12).**

TA250209

Symptom-20 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - TRANSMISSION

TRANSMISSION WILL NOT SHIFT PROPERLY.

NOTE

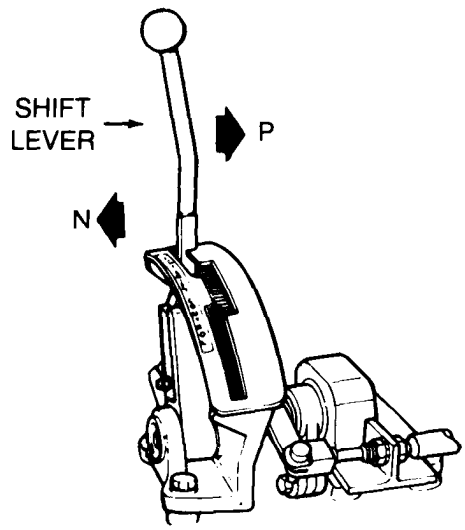
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 **Check shifting control linkage for binding.**

Second Technician (Operator's Station)

- Move the shift lever from Neutral (N) to Reverse (R) several times.
- Check shifting linkage for binding while shifting transmission.

Does shifting control linkage bind?



NO

2
- **Check shifting control linkage adjustment.**

- **See Step (23).**

YES

3
- **Check shifting control hand lever pivot base assembly for binding or obstruction.**

- **See Step (4).**

TA250210

Symptom-20

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)

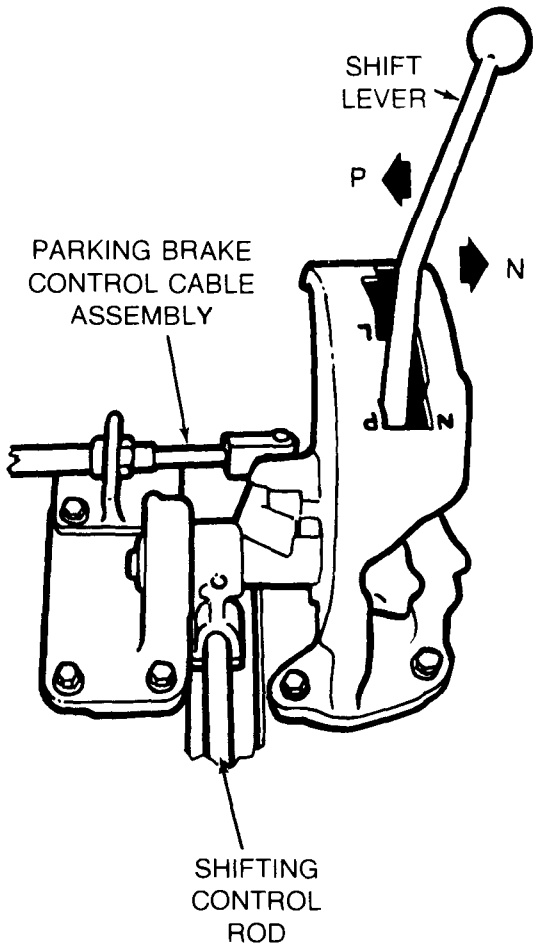
FROM STEP (3) or (25)

4 **Check shifting control hand lever pivot base assembly for binding or obstruction.**

Second Technician (Operator's Station)

- Disconnect shifting control rod from shifting control rod lever pivot base assembly (page 11-2).
- Disconnect parking brake control cable assembly (page 13-19).
- Move shift from Park (P) through Reverse (R) several times.
- Check shifting control hand lever and pivot base assemblies for binding or obstruction, while moving shift lever.

Is shifting control lever and pivot base assembly obstructed or binding?



NO

YES

5 **Repair shifting control and related parts (page 11-2).**

TA25021

Symptom-20

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)

6 **Check shifting control forward inboard link assembly for binding or obstruction.**

Second Technician (Operator's Station)

- Reconnect shifting control rod to shifting control rod lever pivot base assembly (page 11-2).

First Technician (Front of Crew Compartment)

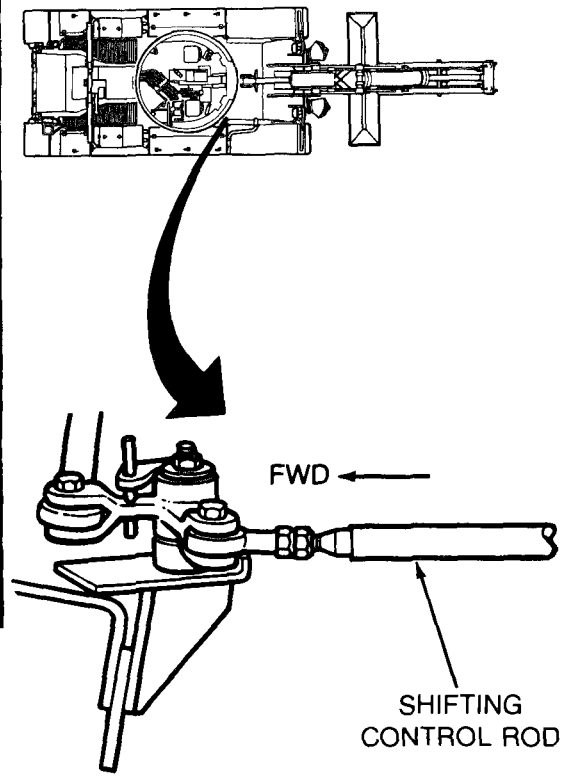
- Disconnect shifting control rod from forward inboard link assembly (page 11-16).

Second Technician (Operator's Station)

- Move shifting lever from Park (P) through Reverse (R) several times.

First Technician (Front of Crew Compartment)

- Check forward inboard link assembly for binding or obstruction while moving shift lever.



Is bulkhead link assembly binding or obstructed?

NO

YES

7 **Notify support maintenance of binding forward inboard link assembly.**

TA250212

Symptom-20

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)

8 **Check the forward outboard link assembly for binding or obstruction.**

First Technician (Front of Crew Compartment)

- Connect shifting control rod to forward inboard link assembly (page 11-16).

First Technician (Commander's Station)

- Disconnect shifting control rod from forward outboard link assembly (page 11-18).

Second Technician (Operator's Station)

- Move shifting lever from Park (P) through Reverse (R) several times.

First Technician (Commander's Station)

- Check forward outboard link assembly for binding or obstruction while moving shift lever.

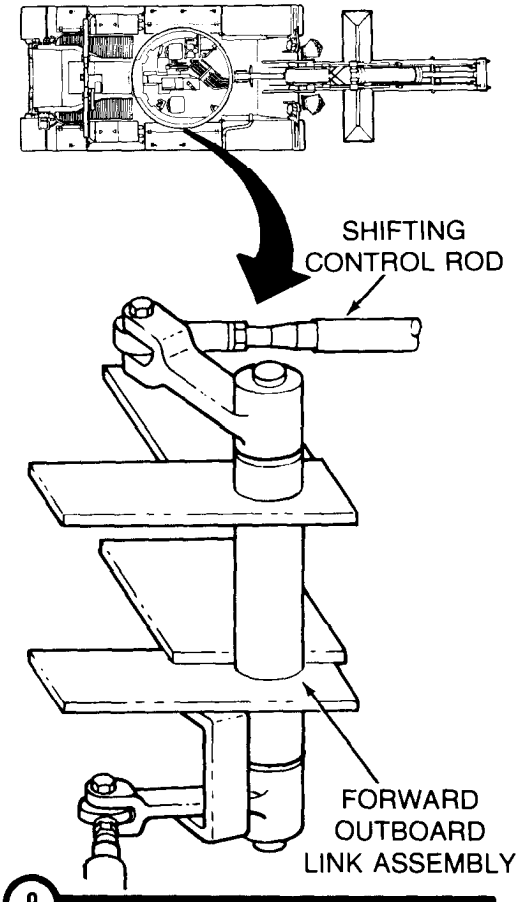
Is forward outboard link assembly obstructed or binding?

NO

YES

9 **Notify support maintenance of binding forward outboard link assembly.**

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



TA250213

Symptom-20

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)

10 **Check shifting control rod for binding or obstruction.**

First Technician (Commander's Station)

- Reconnect shifting control rod to forward outboard link assembly (page 11-19).

First Technician (Rear of Vehicle)

- Have powerplant removed (page 5-2).
- Remove connecting link control box cover (page 11-41).
- Disconnect forward shifting control rod from connecting link assembly (page 11-41).

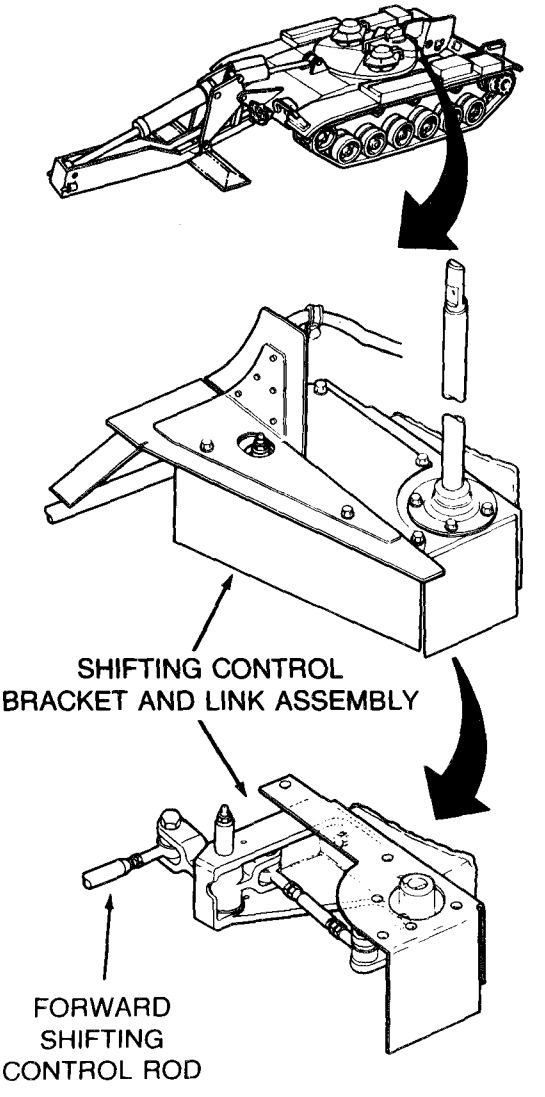
Second Technician (Operator's Station)

- Move shift lever from Neutral (N) through Reverse (R) several times and check forward shifting control rod for binding.

First Technician (Rear of Vehicle)

- Check forward shifting control rod for obstruction.

Is forward shifting control rod obstructed or binding?



NO

YES

11 **Notify support maintenance of binding or obstructed forward shifting control rod.**

TA250214

Symptom-20

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)

12 **Check connecting link assembly for binding or obstruction.**

First Technician (Rear of Vehicle)

- Connect forward shifting control rod to connecting link assembly (page 11-41).
- Disconnect shifting control rod from connecting link assembly (page 11-41).

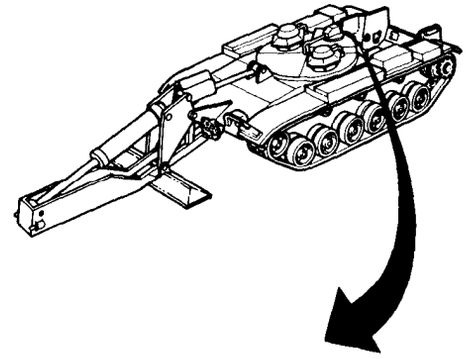
Second Technician (Operator's Station)

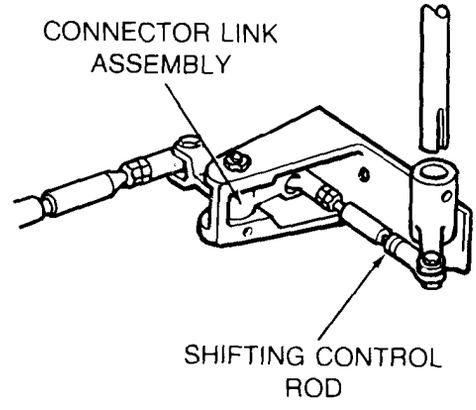
- Move shifting lever from Park (P) through Reverse (R) several times and check connecting link assembly for binding.

First Technician (Rear of Vehicle)

- Check connecting link assembly for obstruction.

Is connecting link assembly obstructed or binding?





NO

YES

13 **Remove, disassemble and inspect connecting link assembly (page 11-41).**

TA250215

Symptom-20

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)

14 **Check lever and bracket assembly for binding or obstruction.**

First Technician (Rear of Vehicle)

- Connect shifting control rod to connecting link assembly (page 11-41).
- Install connecting link control box cover (page 11-41).
- Have powerplant installed (page 5-2).
- Disconnect shifting control rod from lever and bracket assembly (page 11-34).

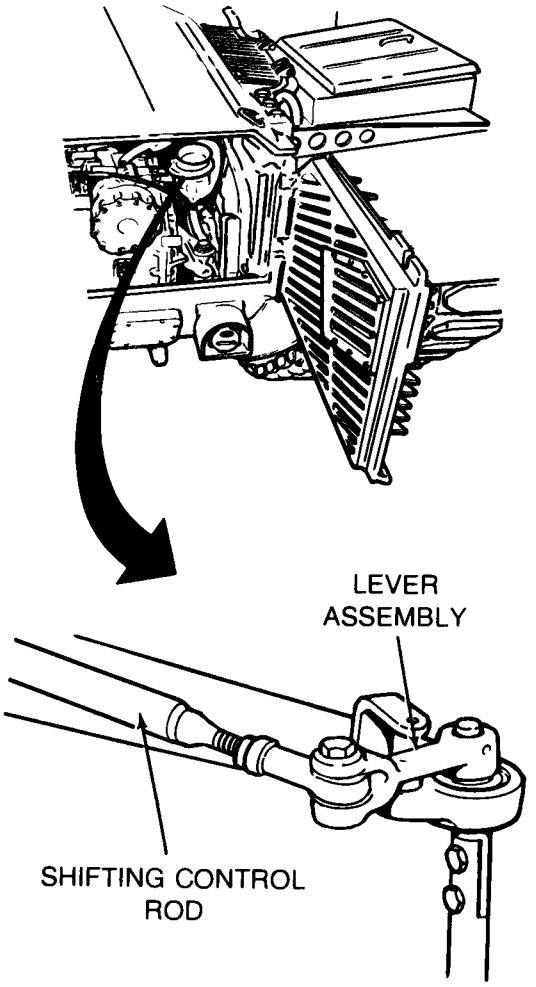
Second Technician (Operator's Station)

- Move shifting lever from Park (P) through Reverse (R) several times and check for binding.

First Technician (Rear of Vehicle)

- Check lever assembly for obstruction.

Is lever and bracket assembly obstructed or binding?



NO

YES

15 **Remove, disassemble and inspect lever and bracket assembly (page 11-41).**

TA250216

Symptom-20

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)

16 **Check shifting control rod and lever assembly for binding or obstruction.**

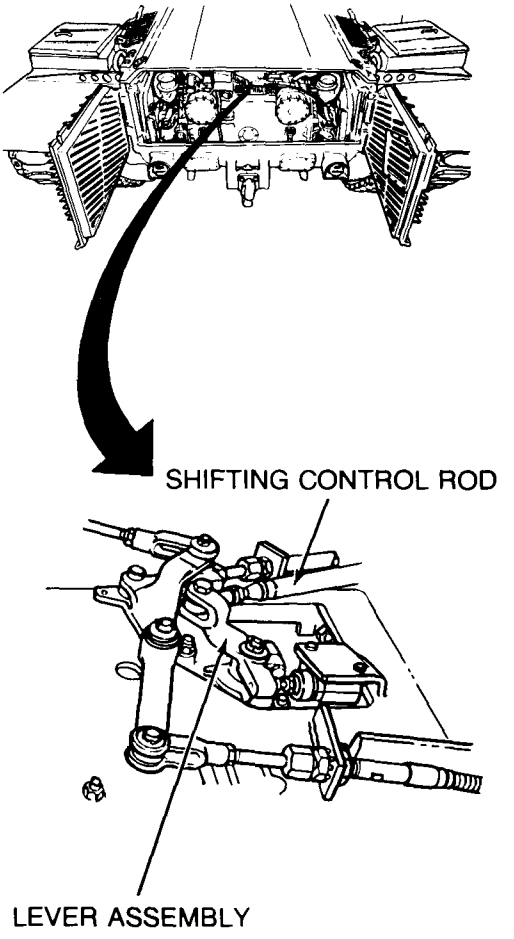
First Technician (Rear of Vehicle)

- Connect shifting control rod to lever and bracket assembly (page 11-34).

Second Technician (Operator's Station)

- Move shifting lever from Park (P) through Reverse (R) several times.
- Check shifting control lever assembly for obstruction or binding.
- Connect parking brake control lever assembly (page 13-90).

Is shifting control lever assembly obstructed or binding?



NO

YES

17 **Remove, disassemble and inspect shifting control rod lever assembly (page 11-34).**

TA250217

Symptom-20

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)

18 **Check service brake for proper adjustment.**

Both Technicians (Outside Vehicle)

- Block tracks to prevent movement of vehicle.

First Technician (Rear of Vehicle)

- Remove brake access covers (page 16-36).
- Remove lockwires and plugs from brake inspection holes located in transmission rear housing left and right side.

Second Technician (Operator's Station)

- Depress brake pedal and observe that pressure gage indicates 750 to 900 psi and keep depressed.

First Technician (Rear of Vehicle)

- Check if index line marked "A" (Applied) alines within 1/64 inch of chiseled line located on edge of brake anchor.

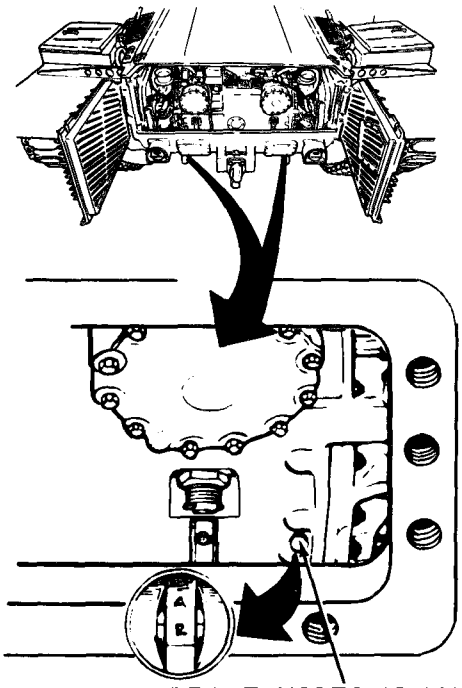
Second Technician (Operator's Station)

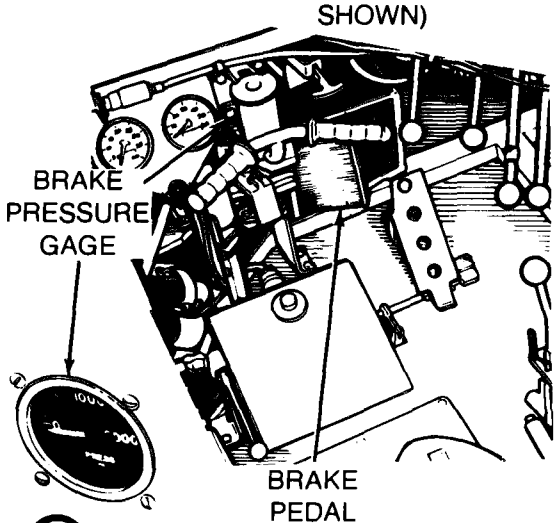
- Release brakes.

First Technician (Rear of Vehicle)

- Check if index line marked "R" (Released) alines within 1/64 inch of chiseled line located on edge of brake anchor.

Are brakes properly adjusted?





YES

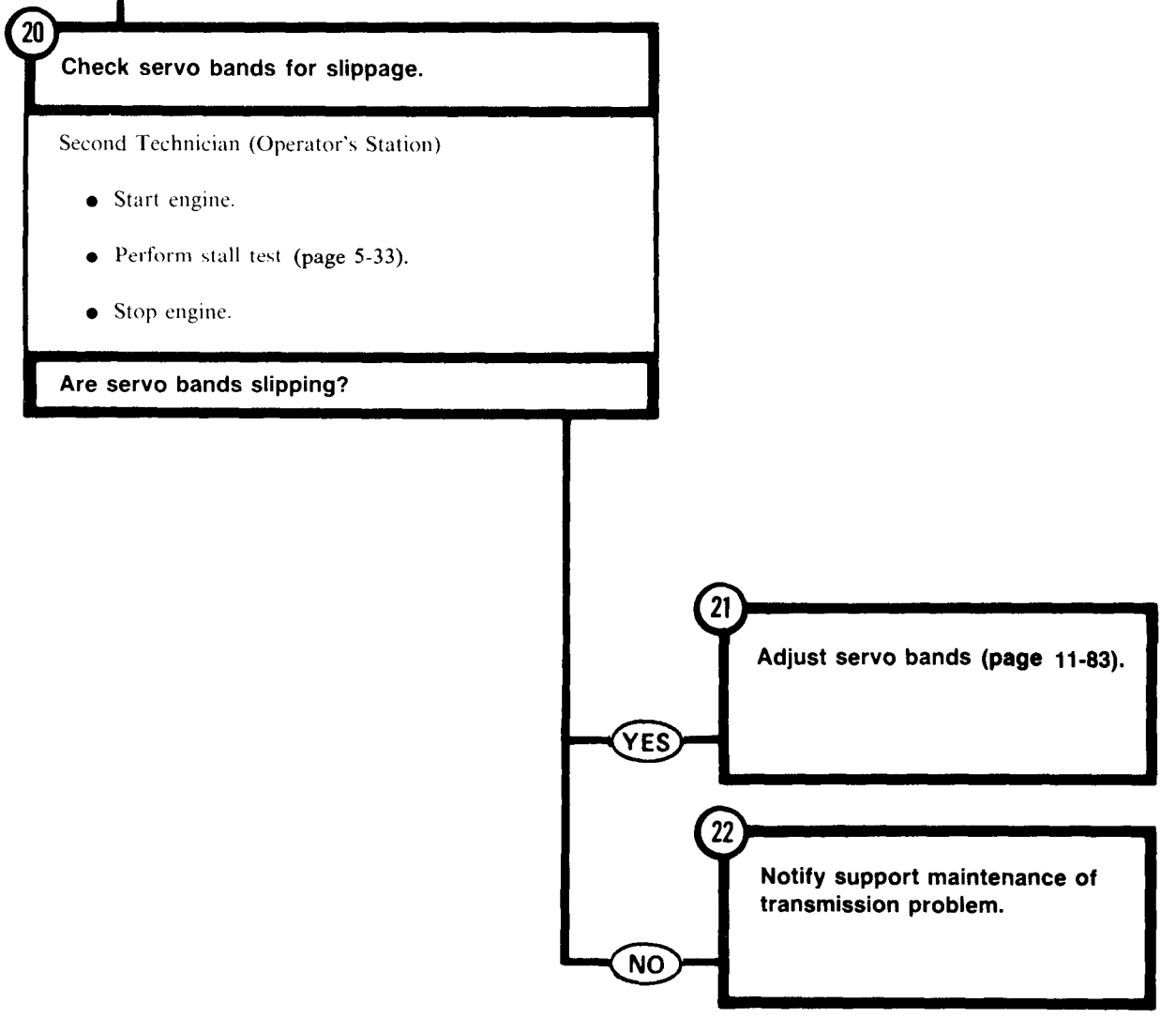
NO

19 **Adjust service brakes (page 13-78).**

TA250218

Symptom-20

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)



TA250219

Symptom-20 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - TRANSMISSION
(Continued)

FROM STEP (2)

(23) Check shifting control linkage adjustment.

Second Technician (Operator's Station)

- Place transmission shifting control lever in N (Neutral) position.

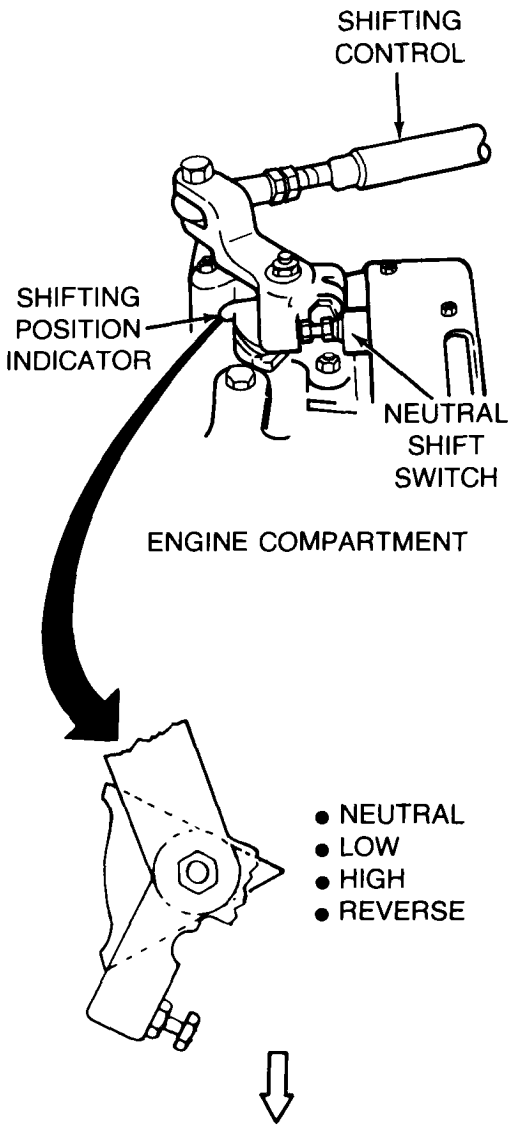
First Technician (Rear of Vehicle)

- Check shifting position indicator at top rear of transmission and observe that position indicator is in the forward dot, designated NEUTRAL.

Is shifting position indicator in NEUTRAL?

(24) Adjust shifting control linkage (page 11-52). — NO

(25)
- **Check shifting control hand lever pivot base assembly for binding or obstruction.**
- **See Step (4).** — YES



TA250220

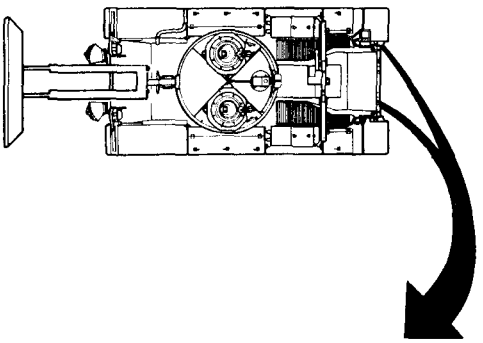
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION

Symptom-21

TRANSMISSION OIL TEMPERATURE GAGE SHOWS RED (POWERPLANT WARNING LAMP ON).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



1 Check right and left outer and inner transmission oil lines for leaks.

First and Second Technicians (Rear Grille Doors)

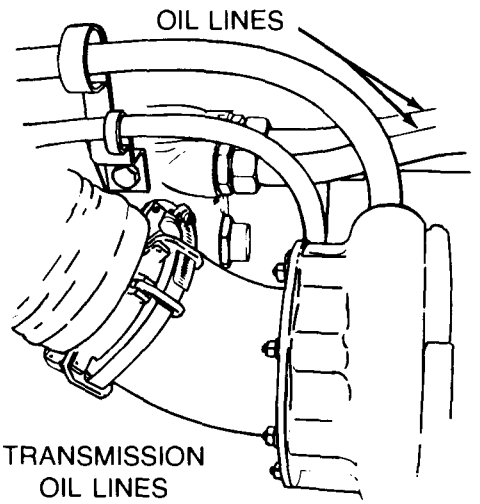
- Remove transmission shroud (page 9-2).

Second Technician (Operator's Station)

- Start engine.

First Technician (Rear Grille Doors)

- Visually check right and left outer and inner oil lines for leaks or damage.



TRANSMISSION OIL LINES (LEFT SIDE SHOWN)

Are transmission oil lines leaking or damaged?

NO

YES

2

- **Tighten leaking oil lines**
- **Replace damaged oil lines**
- **Install transmission shroud (page 9-6).**

TA250221

Symptom-21

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)

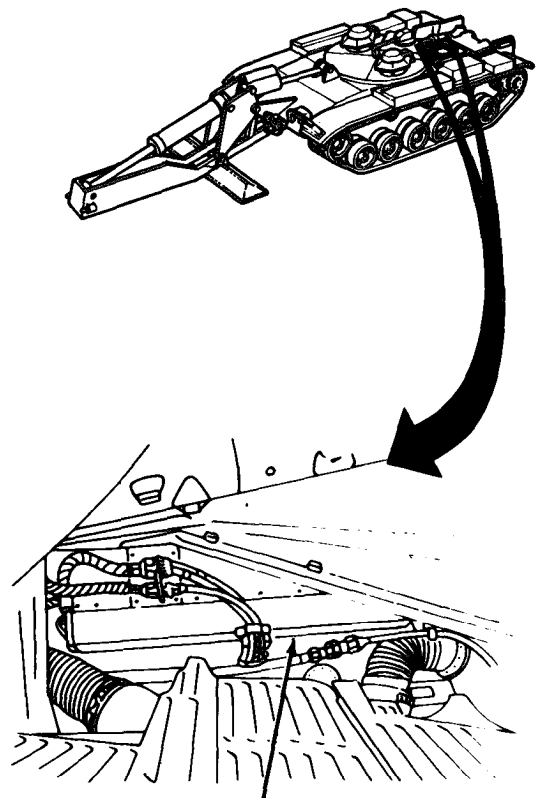
FOR CLARITY TOP DECK NOT SHOWN

3 **Check right and left transmission oil coolers for leaks.**

First Technician (Top Deck)

- Open left and right top deck grille doors.
- Visually check left and right transmission oil coolers for leaks.
- Stop engine.

Are transmission oil coolers leaking?



TRANSMISSION OIL COOLER
(LEFT SIDE SHOWN)

YES → **4** **Replace leaking oil cooler (page 6-19).**

NO

TA250222

Symptom-21

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)

5 **Check service brakes for proper adjustment.**

Both Technicians (Rear Grille Doors)

- Remove plugs from both left and right brake inspection holes.

Second Technician (Operator's Station)

- Press brake pedal and hold when pressure of 750 to 900 psi is reached.

First Technician (Rear Grille Doors)

- Check if index line marked A (Applied) aligns within 1/64 inch of chiseled line located on edge of brake anchor.

Second Technician (Operator's Station)

- Release brakes.

First Technician (Rear Grille Doors)

- Check if index line marked R (Released) aligns within 1/64 inch of chiseled line located on edge of brake anchor.

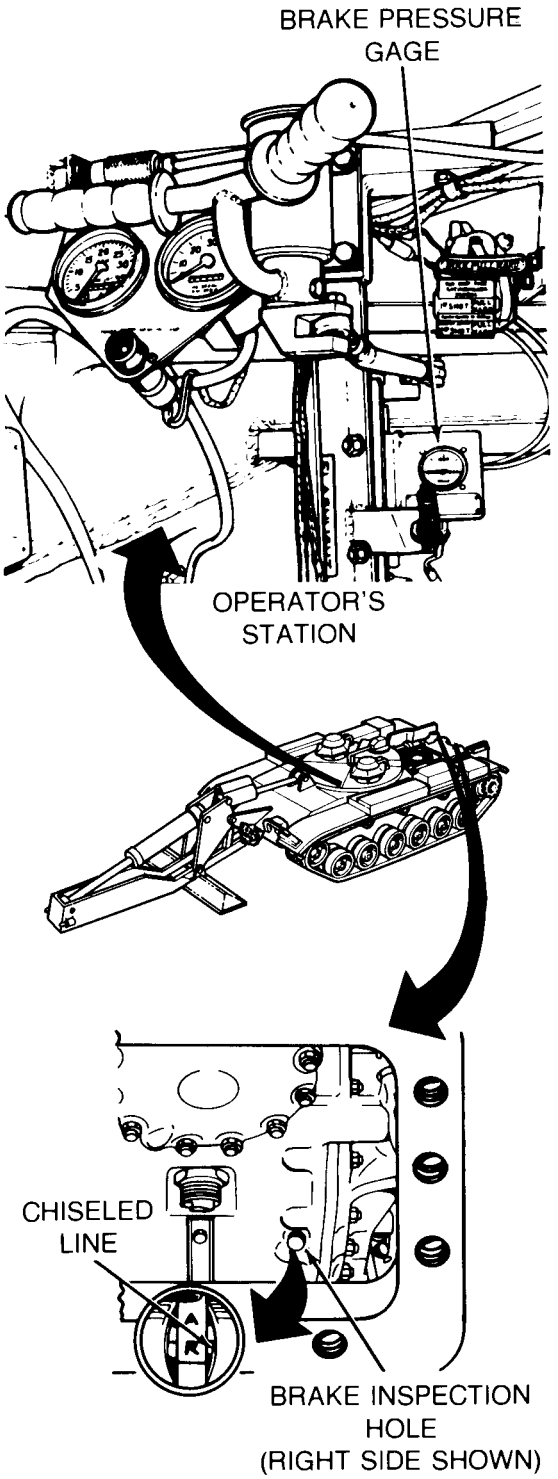
Are service brakes properly adjusted?

6

- **Adjust service brakes (page 13-78).**
- **Close left and right top deck grille doors.**

NO

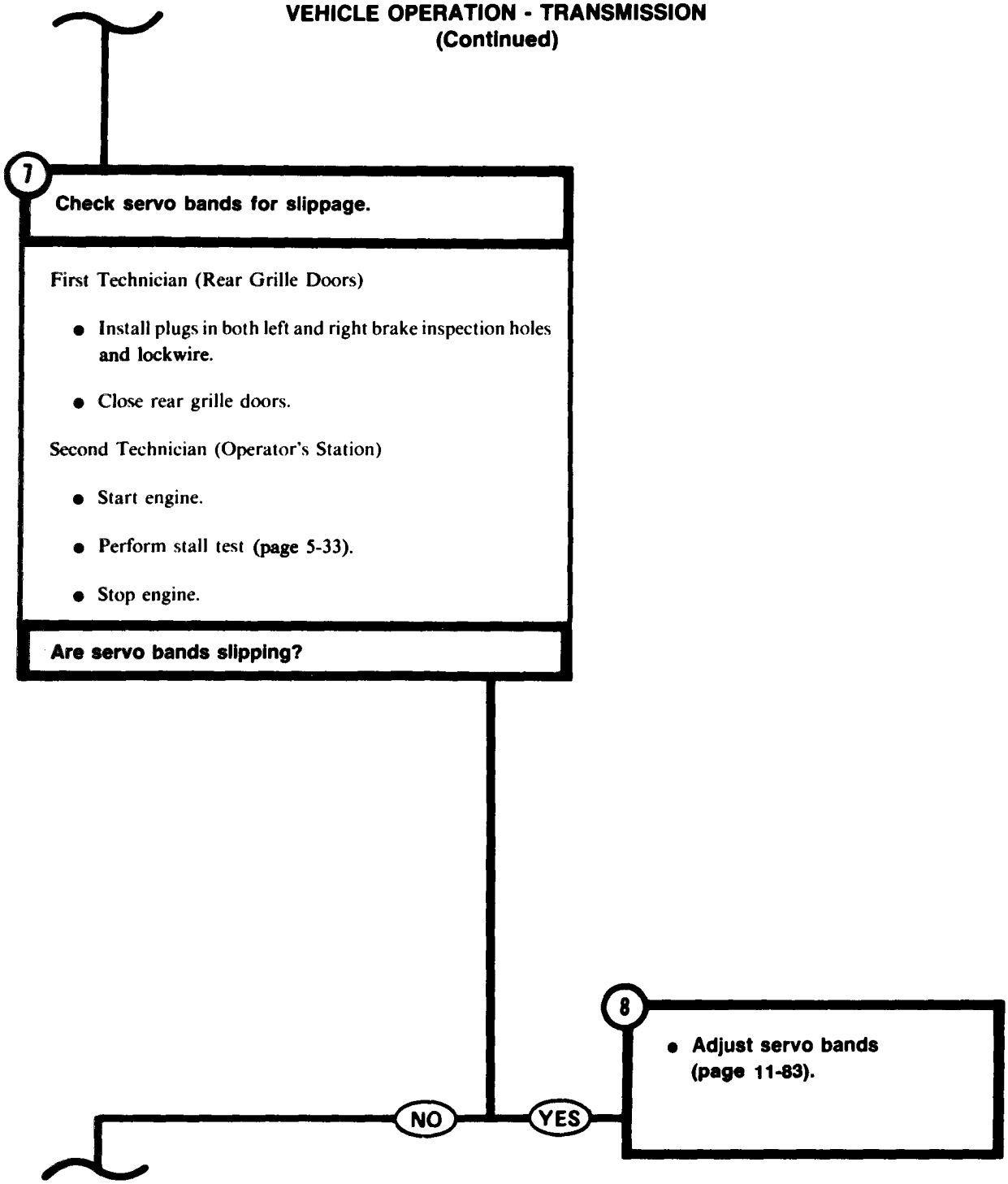
YES



TA250223

Symptom-21

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)



TA250224

Symptom-21

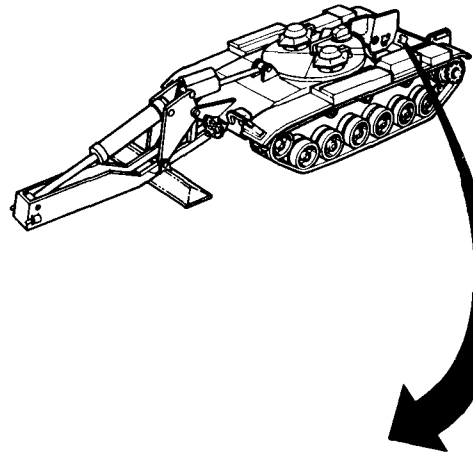
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)

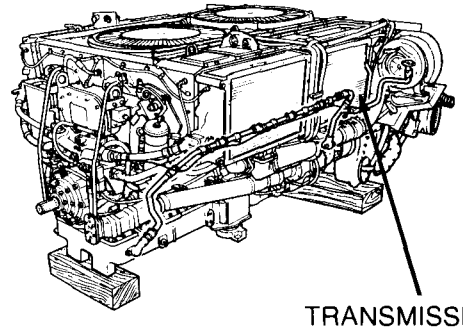
9 **Check transmission oil coolers for clogged cores and screens.**

Both Technicians (Outside Vehicle)

- Have powerplant removed (page 5-2).
- Remove oil cooler screens (page 6-53).
- Shine light through cores and screens.
- Check oil cooler cores and screens for clogged or dirty condition.

Are transmission oil cooler screens and cores clean?





(POWERPLANT - RIGHT SIDE)

YES

NO

10

- **Clean transmission oil cooler screens and cores (page 6-48).**

TA250225

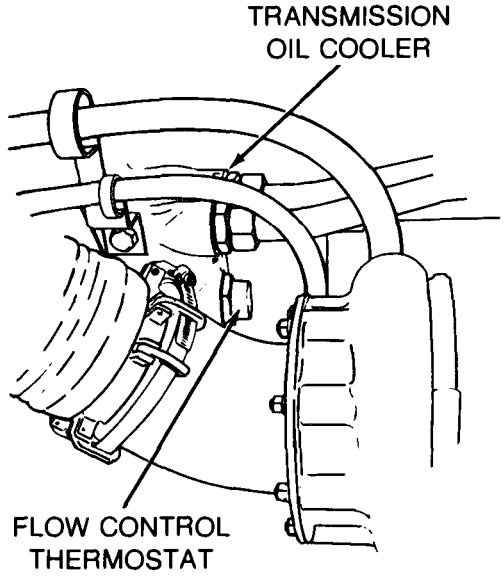
Symptom-21

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - TRANSMISSION
(Continued)

11 **Check if transmission oil cooler flow control thermostatic bypass valves work.**

- Install oil cooler screens (page 6-54).
- Remove right and left transmission oil cooler flow control thermostats (page 6-25 and 6-32).
- Check both thermostats for proper operation (page 6-28).

Do both flow control thermostatic bypass valves work?



NO

12
- **Replace defective control thermostatic bypass valve (page 6-29).**

YES

13
- **Notify support maintenance of transmission oil temperature problem.**
- **Have powerplant installed (page 5-14).**

TA250226

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES

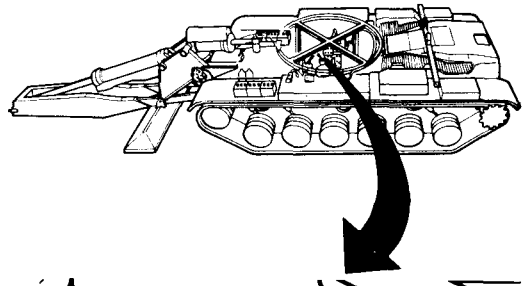
Symptom-22

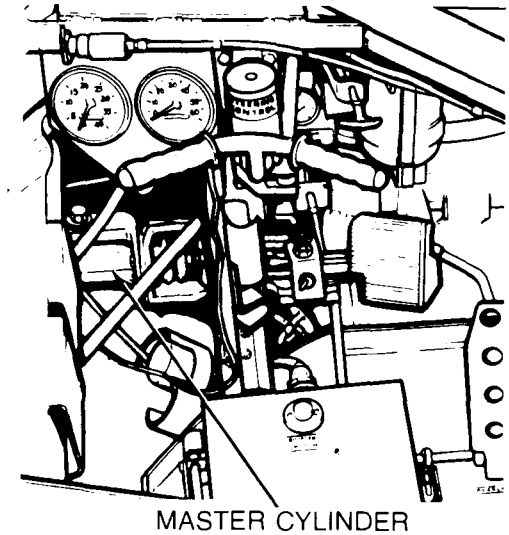
SERVICE BRAKES WILL NOT WORK RIGHT.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN





1 Check fluid level in master cylinder.

Both Technicians (Outside Vehicle)

- Block tracks front and rear to prevent movement of vehicle.

First Technician (Operator's Station)

- Remove master cylinder cap.
- Check fluid in master cylinder for proper level. Hydraulic fluid level should be within 1/4 inch from top of master cylinder.

Is fluid level within 1/4 inch from top of master cylinder?

YES

NO

2

- **Service master cylinder (LO5-5420-226-12).**
- **Check master cylinder for leaks.**

- **See Step (10).**

TA250227

Symptom-22

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)

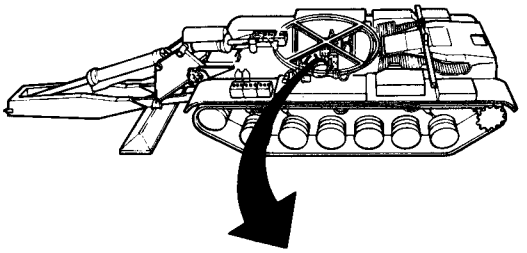
3 **Check for air in brake system.**

First Technician (Operator's Station)

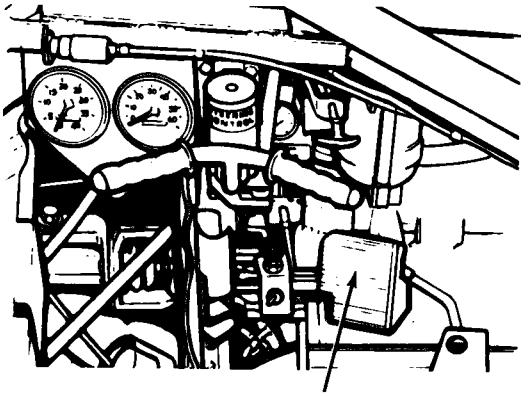
- **Install master cylinder cap.**
- Place shift control lever in N (neutral) position.
- Press brake pedal several times and hold.
- Check that brake pedal feels firm - not soft or "spongy".

Does brake pedal feel firm?

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



OPERATOR'S STATION



YES

NO

4

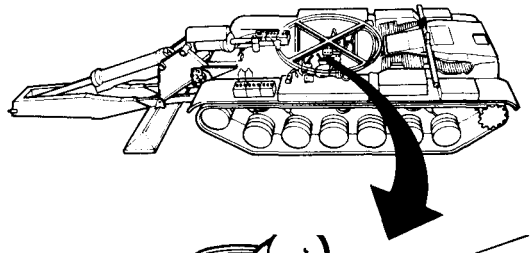
- **Bleed brake system (page 13-86).**

TA250228

Symptom-22

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

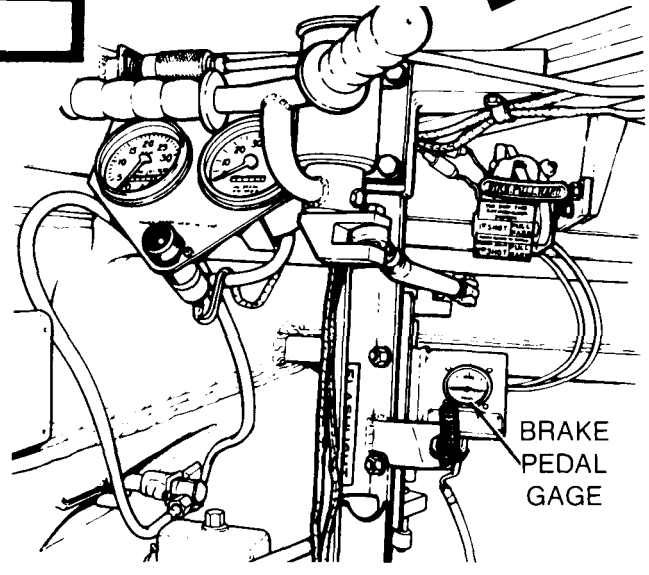


5 **Check brake pedal linkage for proper adjustment.**

First Technician (Operator's Station)

- Press brake pedal several times and observe that gage reads 750 psi to 900 psi.

Is brake pedal linkage properly adjusted?



YES

NO

6 **Adjust brake pedal linkage (page 13-78).**

TA250229

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)

Symptom-22

7 **Check service brakes for proper adjustment.**

Both Technicians (Rear Grille Doors)

- Remove transmission access covers (page 16-34).
- Remove lockwires and plugs from both right and left brake inspection holes.

First Technician (Operator's Station)

- Press brake pedal and observe pressure gage indicates 750-900 psi and keep pressed.

Second Technician (Brake Inspection Holes)

- Check if index line marked A (Applied) alines within 1/64 inch of chiseled line located on edge of brake anchor.

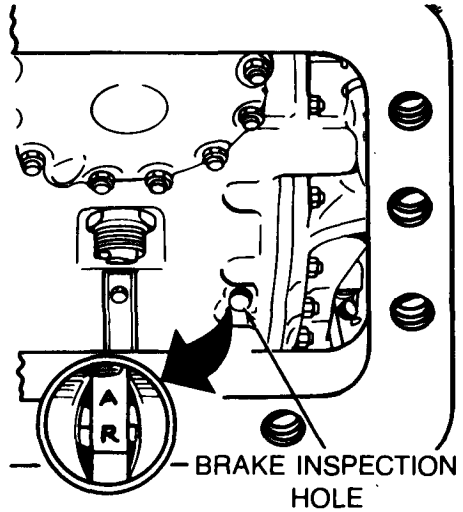
First Technician (Operator's Station)

- Release brakes.

Second Technician (Brake Inspection Holes)

- Check if index line marked "R" (Released) alines within 1/64 inch of chiseled line located on edge of brake anchor.

Are service brakes properly adjusted?



UNDER REAR GRILLE DOORS

NO

8 **Adjust service brakes (page 13-78).**

YES

9

- **Notify support maintenance of service brake problem.**
- **Install plugs in both right and left brake inspection holes and lockwire.**

TA250230

Symptom-22

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)

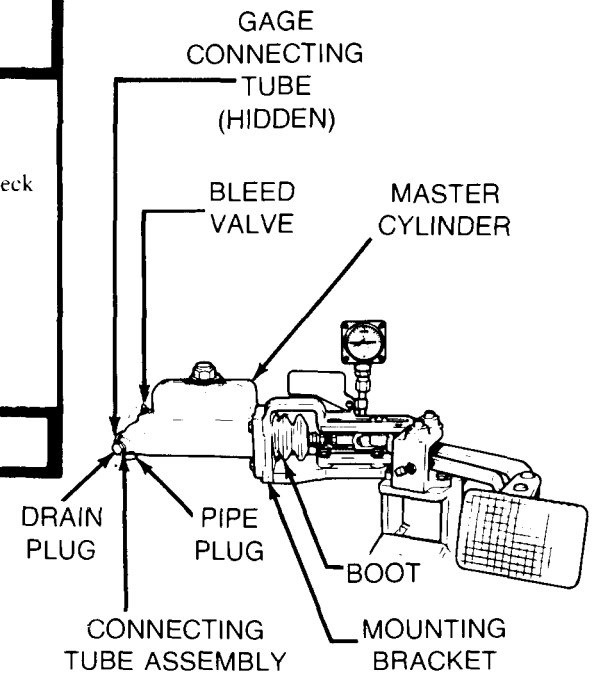
FROM STEP 2

10 Check master cylinder for leaks.

First Technician (Operator's Station)

- Apply 750-900 psi pressure to brake system and check indicator needle for loss of pressure.
- Check master cylinder assembly for leaks at the mounting bracket boot, drain plug, bleeder valve, pipe plug and connecting tube assembly.

Is master cylinder leaking?



NO

YES

11 Replace leaking master cylinder (page 13-2).

TA250231

Symptom-22

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)

12 **Check brake hydraulic lines from master cylinder along bulkhead to back of transmission for leaks or damage.**

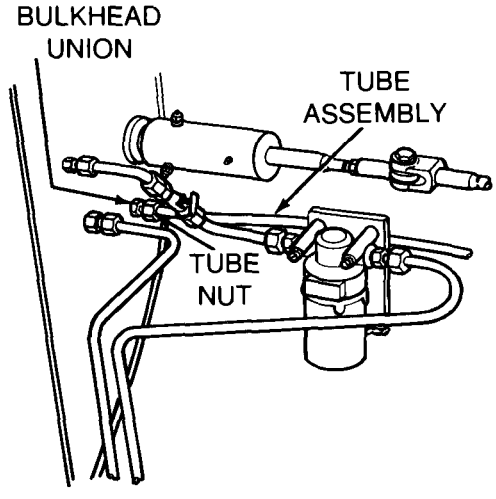
First Technician (Operator's Station)

- Visually check brake hydraulic line from master cylinder along bulkhead for loose connections or damage.
- Visually check hydraulic lines and fittings from bulkhead to engine compartment for leaks or damage.

Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).
- Visually check hydraulic lines and fittings at rear of transmission for leaks or damage.

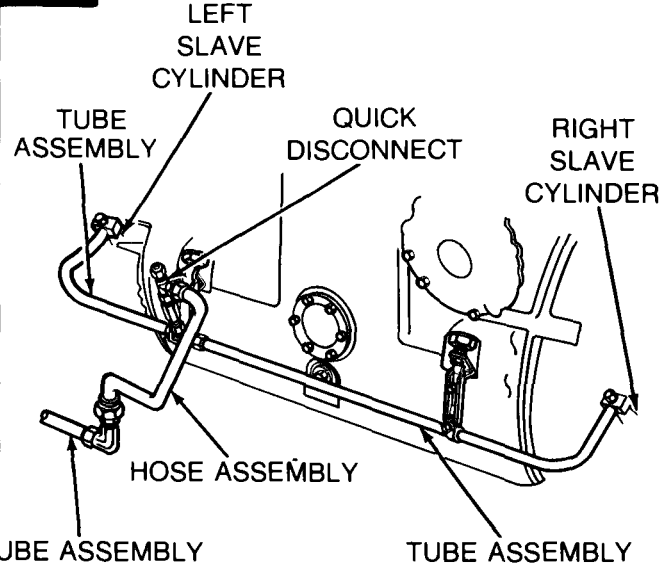
Are hydraulic lines and fittings leaking or damaged?



13 **Replace leaking or damaged hydraulic lines and fittings.**

YES

NO



TA250232

Symptom-22

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)

14 **Check left and right slave cylinders and lower hydraulic lines for leaks or damage.**

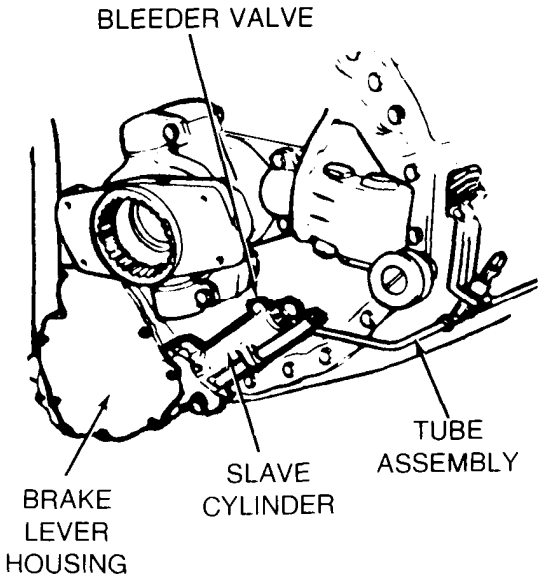
First Technician (Rear of Vehicle)

- Have powerplant removed (page 5-2).

First Technician (Powerplant)

- Check left and right slave cylinders for leaks at bleeder valve, plug assembly and connecting tube assemblies.
- Remove drain plug from bottom of brake lever housing and check for evidence of brake fluid, indicating leaking cylinder at preformed packing.

Are slave cylinders or lower lines leaking or damaged?



YES

NO

15 **Replace leaking slave cylinder and lower hydraulic lines (page 13-54 or 13-58).**

TA250233

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)

Symptom-22

16 **Check for movement of brake application lever and damaged parts.**

First Technician (Powerplant)

- Remove left and right brake housing covers from side of transmission (page 13-65).
- Visually inspect brake application levers for broken and damaged parts.
- Using a pry bar, move brake application levers counterclockwise and check if brake apply shaft moves.

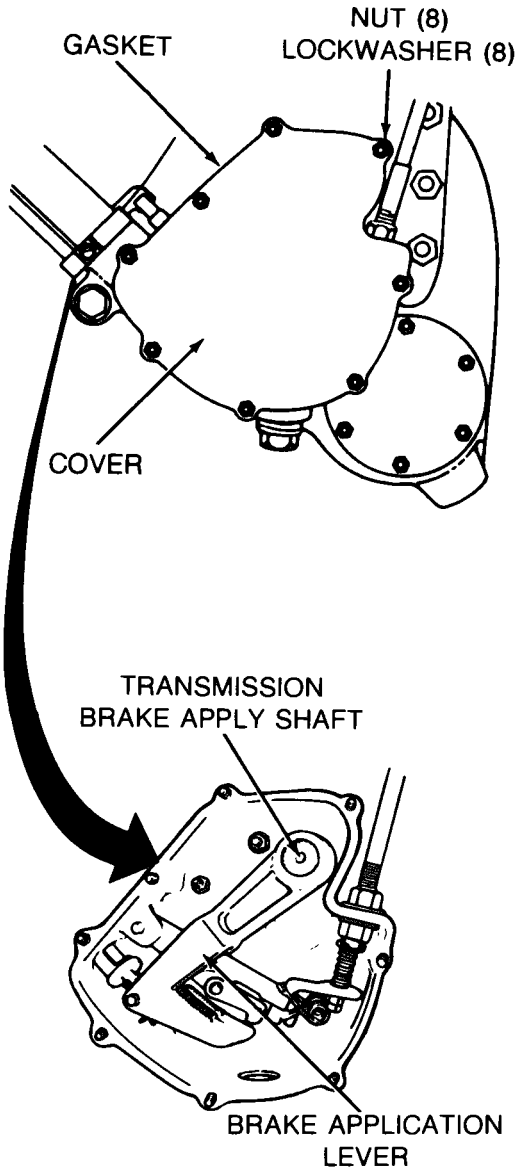
Is brake application lever broken or damaged?

YES

17
- **Repair brake control housing assembly (page 13-64).**
- **Have powerplant installed (page 5-14).**

NO

18
- **Install brake control housing covers (page 13-77).**
- **Have powerplant installed (page 5-14).**
- **Notify support maintenance of service brake problem.**



TA250234

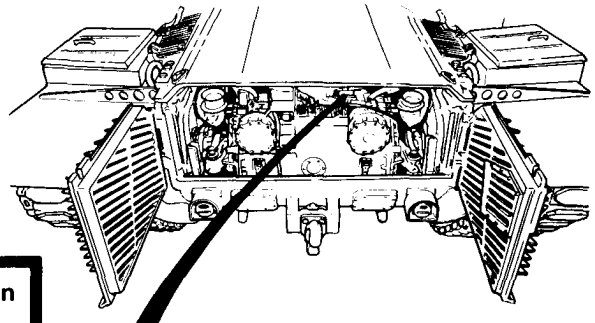
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES

Symptom-23

PARKING BRAKE WILL NOT RELEASE.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



1 Check if parking brakes will release by using prybar on bellcrank.

Both Technicians (Outside Vehicle)

- Block tracks to prevent movement of vehicle.

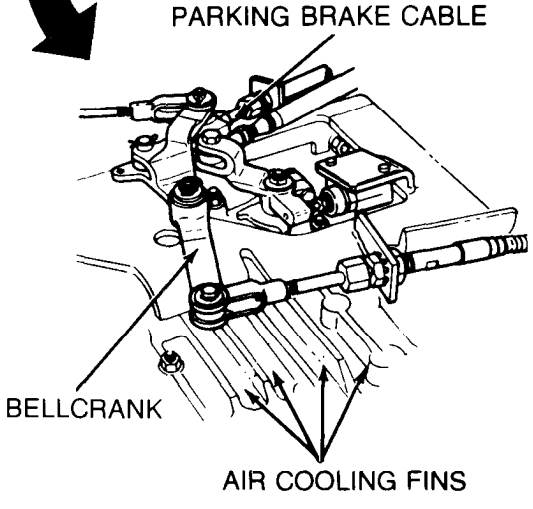
Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

First Technician (Rear Grille Doors)

- Disconnect parking brake cable at bellcrank on top of transmission (page 13-110).
- Attempt to release brakes by carefully using short prybar on the bellcrank at air cooling fin (DO NOT USE EXCESSIVE FORCE).

Did parking brakes release?



NO

YES

2

- **Malfunction corrected.**
- **Connect parking brake cable (page 13-119).**
- **Adjust parking brake cable (page 13-126).**

TA250235

Symptom-23

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)

3 **Check service brakes for proper adjustment.**

First Technician (Rear Grille Doors)

- Remove lockwires and plugs (one located on each side of transmission rear housing) from brake inspection holes.

Second Technician (Operator's Station)

- Press brake pedal and hold when pressure of 750 to 900 psi is reached.

First Technician (Rear Grille Doors)

- Check if index line marked "A" (Applied) alines within 1/64 inch of chiseled line located on edge of brake anchor.

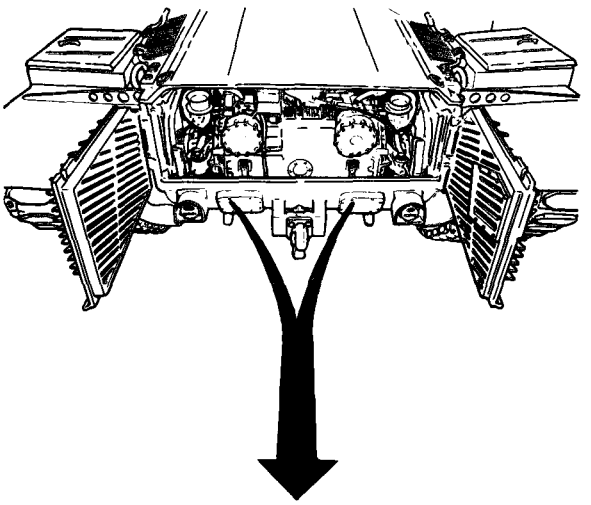
Second Technician (Operator's Station)

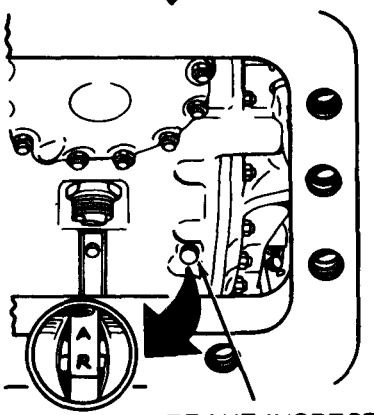
- Release brakes.

First Technician (Rear Grille Doors)

- Check if index line marked "R" (Released) alines within 1/64 inch of chiseled line located on edge of brake anchor.

Are service brakes properly adjusted?





BRAKE INSPECTION HOLE (RIGHT SIDE SHOWN)

YES

NO

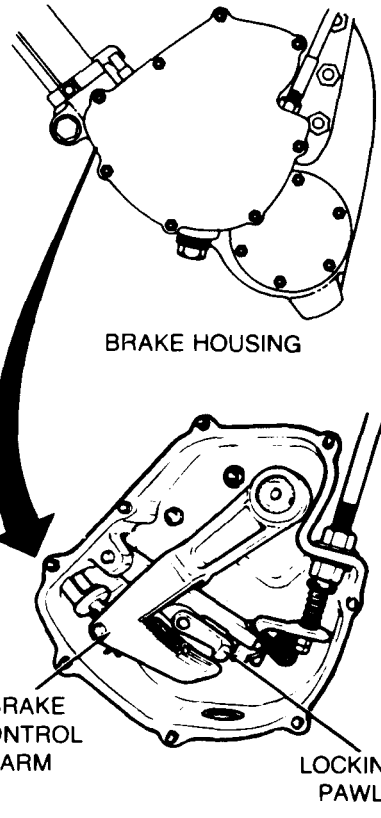
4

- **Adjust service brakes (page 13-78).**
- **Connect parking brake cable (page 13-119).**

TA250236

Symptom-23

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)



5 **Check if parking brake locking pawls are in the released position.**

First Technician (Top Deck)

- Have powerplant removed (page 5-2).

First Technician (Powerplant)

- Remove left and right brake housing covers from side of transmission (page 13-65).
- Check if locking pawls are released from left side and right side brake control arms.

Are both locking pawls released from brake control arms?

YES

6 **See Symptom 22: SERVICE BRAKES WILL NOT WORK RIGHT (page 4-342).**

NO

7 **Repair parking brakes housing assembly (page 13-64).**

TA250237

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES

Symptom-24

PARKING BRAKES CANNOT BE APPLIED.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check service brake system pressure.

Second Technician (Operator's Station)

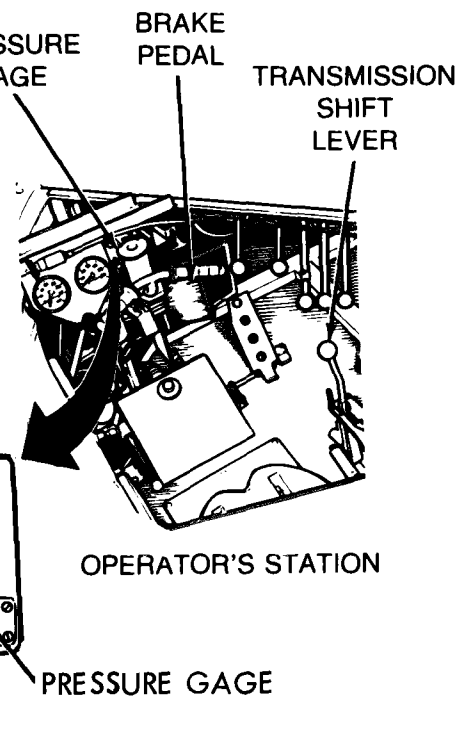
- Move transmission shift lever to park (P) position.
- Press brake pedal and observe pressure gage reading of 750 to 900 psi.

Is brake system pressure 750 to 900 psi?

NO

2 See Symptom 22: SERVICE BRAKES WILL NOT WORK RIGHT (page 4-342).

YES



TA250238

Symptom-24

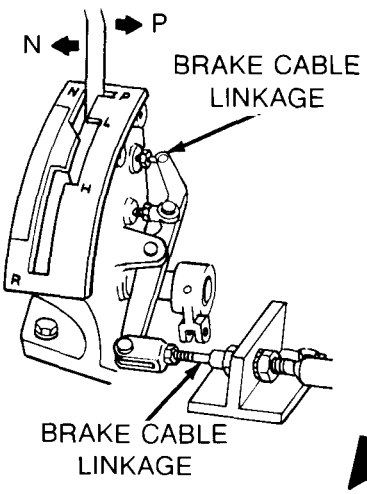
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)

3 **Check shifting control hand lever base assembly for damage or improper operation.**

Second Technician (Operator's Station)

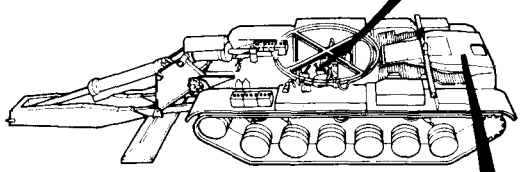
- Move transmission shift lever to the left and right from park (P) to neutral (N) position.
- Check parking brake cable and linkage for disconnects or damage.

Is parking brake cable and linkage disconnected or damaged?



YES

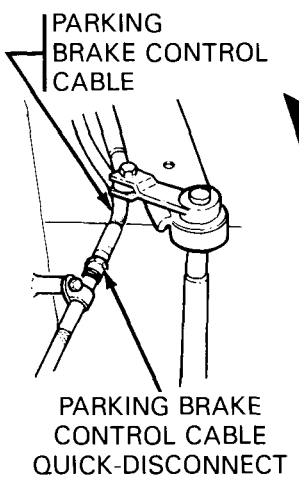
4
- **Connect disconnected linkage or brake control cable. If not disconnected, remove and inspect shifting control hand lever base assembly and replace damaged parts (page 11-2).**



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

NO

5 **First Technician (Rear Grille Doors)**
- **If vehicle has one piece brake control cable, see step 9.**
- **If vehicle has two piece brake control cable, see step 12.**



TA250239

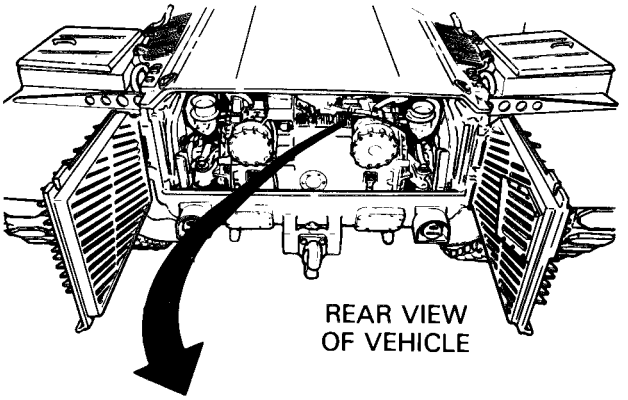
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)

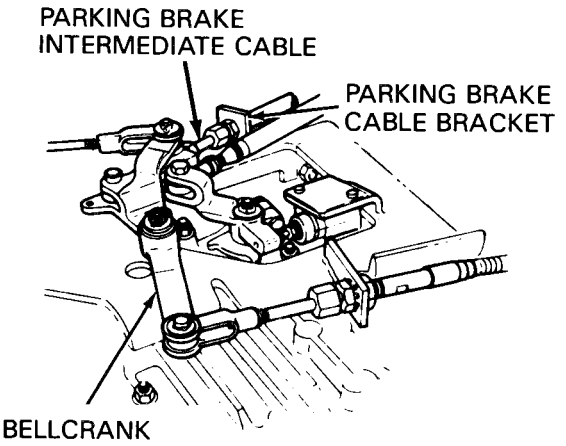
Symptom-24

6 **Check parking brake cable and linkage at bellcrank for disconnects or damage.**

Both Technicians (Rear Grille Doors)
- Remove transmission shroud (page 9-2).

Is parking brake cable and linkage disconnected or damaged?





YES

7
- **Connect disconnected linkage or brake control cable. If not disconnected, remove and inspect parking brake control assembly (page 13-110) and replace damaged parts**

NO

8 **Go to block 9.**

TA250240

Symptom-24

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)

9 Check for smooth movement of parking brake control cable assembly in operator's station.

Both Technicians (Rear Grille Doors)

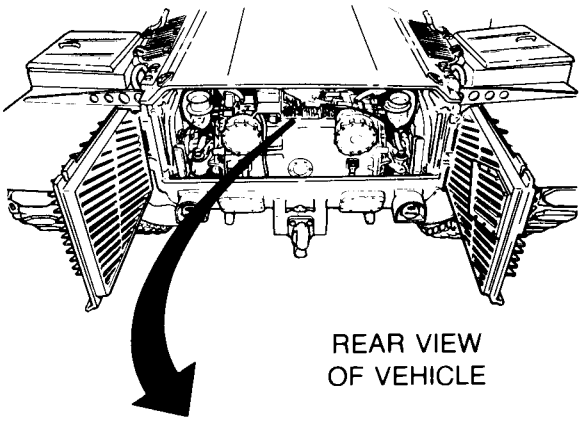
- Remove parking brake cable control assembly from bell crank assembly (page 13-110).
- Remove parking brake cable bracket from transmission (page 13-110).

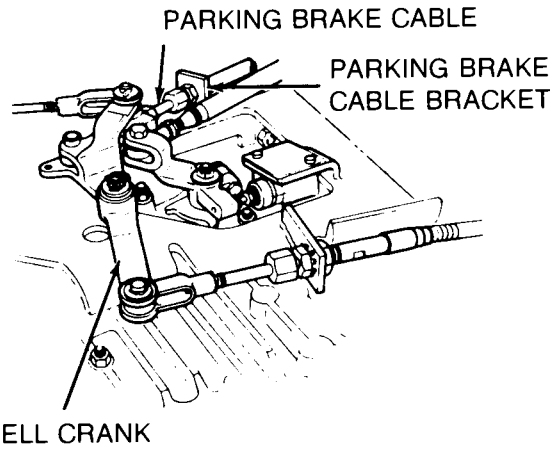
Second Technician (Operator's Station)

- Move shift lever from the neutral (N) to park (P) positions several times.

First Technician (Rear of Vehicle)

- Check movement of parking brake control assembly at disconnected bell crank while transmission shift lever is being operated.





Does parking brake cable control assembly operate smoothly?

YES

11
- **Check bellcrank assembly for proper operation.**
- **See step 17.**

NO

10 Remove and inspect parking brake control assembly (page 13-107), remove cause of binding (rust or burrs), or replace damaged parts.

TA250241

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)

Symptom-24

12 **Check for smooth movement of parking brake control cable assembly at quick-disconnect.**

Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-20).
- Disconnect parking brake cable quick-disconnect.

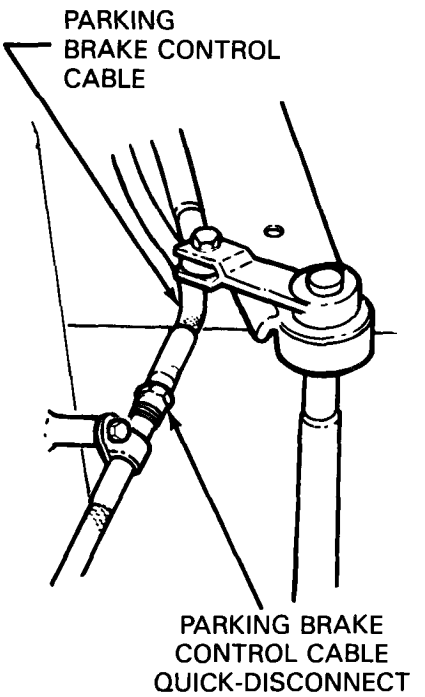
Second Technician (Driver's Station)

- Move shift lever from neutral (N) to park (P) positions several times.

First Technician (Rear of Vehicle)

- Check that quick-disconnect is not damaged and that parking cable moves freely at quick-disconnect while transmission shift lever is being operated.

Is quick disconnect free of damage and does cable move smoothly without binding?



YES

NO

13 **Remove and inspect parking brake control assembly (page 13-90). Remove cause of binding (rust or burrs) or replace damaged parts.**

TA250242

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)

Symptom-24

14 **Check for smooth movement of parking brake intermediate cable assembly at bellcrank.**

First Technician (Rear Grille Doors)

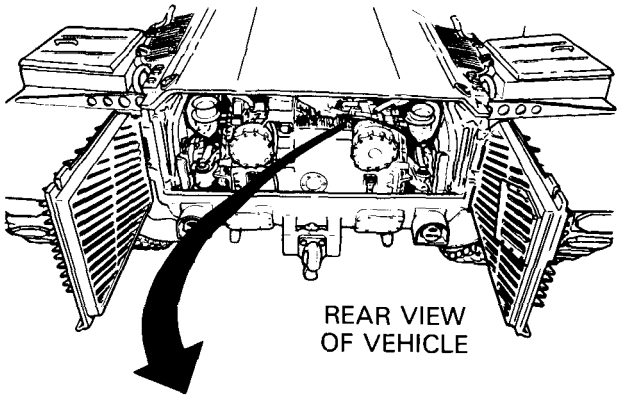
- Connect parking brake cable quick-disconnect.
- Remove parking brake intermediate cable from bellcrank assembly (page 13-128).
- Remove parking brake cable bracket from transmission (page 13-128).

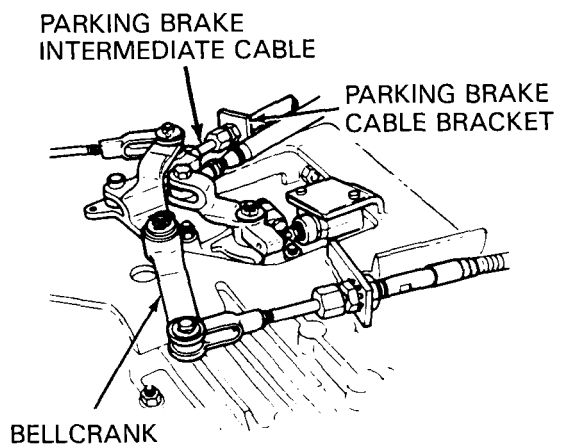
Section Technician (Driver's Compartment)

- Move shift lever from the "N" (neutral) to "P" (park) positions several times.

First Technician (Rear of Vehicle)

- Check movement of parking brake intermediate cable at disconnected bellcrank while transmission shift lever is being operated.





Does parking brake intermediate cable operate smoothly?

YES → **16**

- **Check bellcrank assembly for proper operation.**
- **See step 17.**

NO → **15** **Remove and inspect intermediate cable (page 13-128). Remove cause of binding (rust or burrs), or replace damaged parts.**

TA250243

Symptom-24

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)

17 **Check bellcrank assembly for proper operation.**

First Technician (Rear of Vehicle)

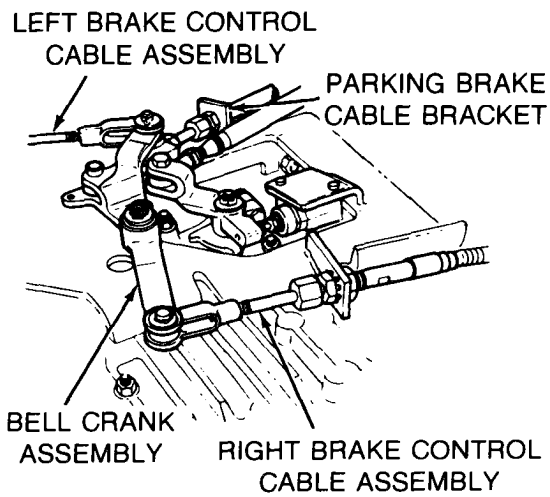
- Remove both right and left parking brake control assemblies in engine compartment from bell crank (page 13-110).
- Install parking brake intermediate cable on bell crank (page 13-131).
- Install parking brake cable bracket to transmission (page 13-119).

Second Technician (Operator's Station)

- Move shift lever from netural (N) to park (P) positions several times.

First Technician (Rear of Vehicle)

- Check movement of bell crank assembly while shift lever is being operated.



Does bell crank assembly operate smoothly?

YES

NO

18 **Remove and inspect bellcrank assembly (page 13-122), remove cause of binding (rust or burrs), or replace damaged parts.**

TA250244

Symptom-24

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATON - BRAKES
(Continued)

19 **Check for smooth movement of parking brake cable assembly inside right brake housing.**

Both Technicians (Outside Vehicle)

- Have powerplant removed (page 5-2).

First Technician (Right Side of Transmission)

- Remove right side brake housing cover (page 13-65).

Second Technician (Top of Transmission)

- Connect right side brake control cable to bellcrank (page 13-119).
- Using small prybar, move bellcrank to the right and then to the left.

First Technician (Right Side of Transmission)

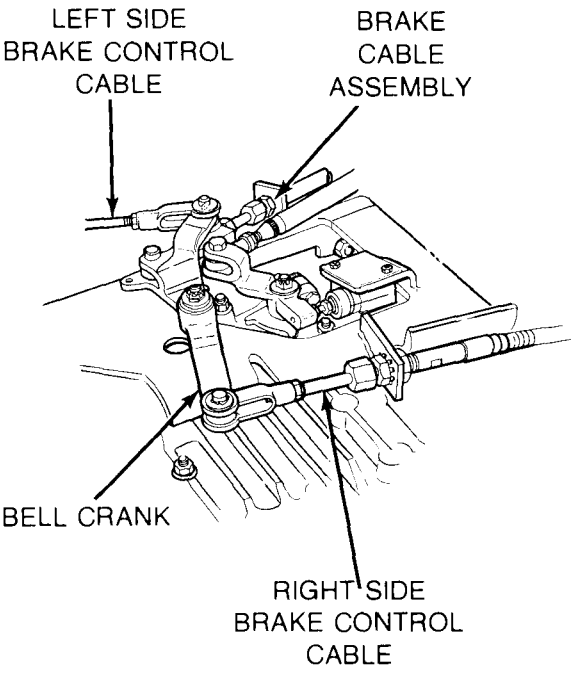
- Observe movement of right parking brake control cable assembly while bell crank is being moved right and left.

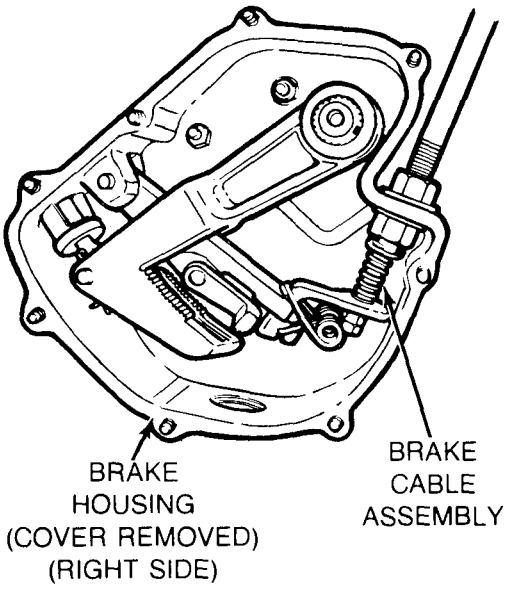
Does parking brake cable assembly move smoothly?

20 **Replace defective parking brake cable assembly from bell crank to brake housing (page 13-107).**

NO

YES





TA250245

Symptom-24

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - BRAKES
(Continued)

21 **Check for smooth movement of parking brake cable assembly inside left brake housing.**

First Technician (Left Side of Transmission)

- Remove left side brake housing cover (page 13-65).

Second Technician (Top of Transmission)

- Connect left side brake control cable to bellcrank (page 13-119).
- Using small pry bar, move bellcrank to the left and then to the right.

First Technician (Left Side of Transmission)

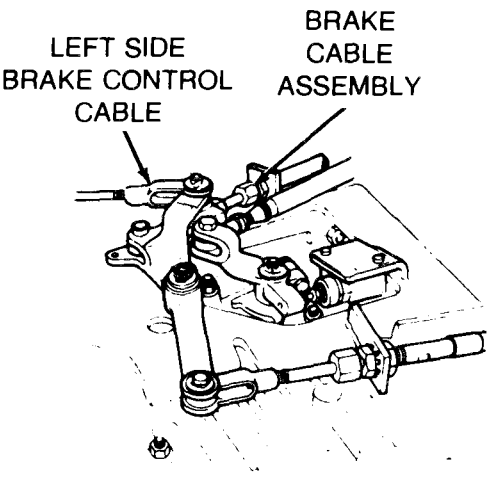
- Observe movement of left parking brake control cable assembly while bell crank is being moved left and right.

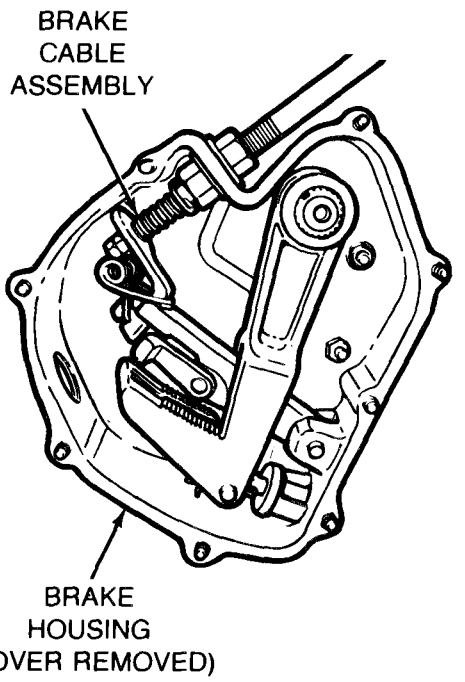
Does parking brake cable assembly move smoothly?

22 **Replace defective parking brake cable assembly from bell crank to brake housing (page 13-107).**

NO

YES





TA250246

Symptom- 24

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATIONS - BRAKES
(Continued)

23 **Check brake control arm and locking pawl for proper operation.**

First Technician First Right and Then Left (Sides of Transmission)

- Using brake application tools, set left and right brakes in applied positioin. (page 5-33)

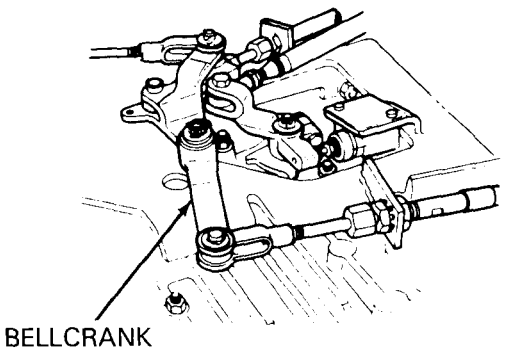
Second Technician (Top of Transmission)

- Using pry bar, move bell crank

First Technician (Sides of Transmission)

- Check that left and right locking pawl engages associated brake control arm.

Do locking pawls engage brake control arms?

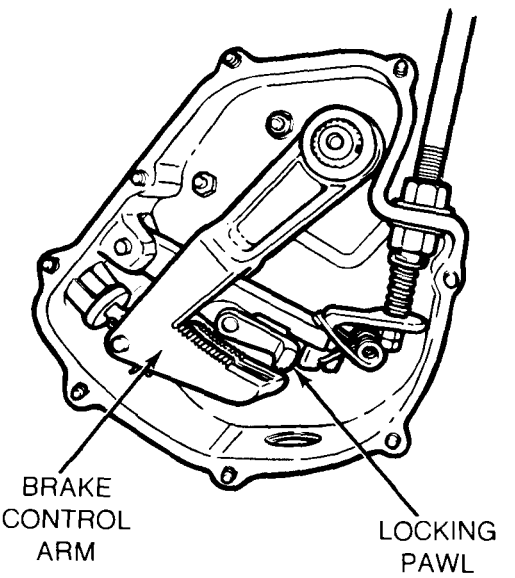


24 **Repair brake control housing assembly (page 13-64).**

NO

25 **Notify support maintenance of brake problem.**

YES



(RIGHT SIDE SHOWN)

TA250247

Symptom-25 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - STEERING

VEHICLE WILL NOT STEER PROPERLY

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 **Check steering control linkage for binding.**

Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).
- Disconnect steering control rod from transmission connecting link (page 15-26).

Second Technician (Operator's Station)

- Move steering control handle right and left.

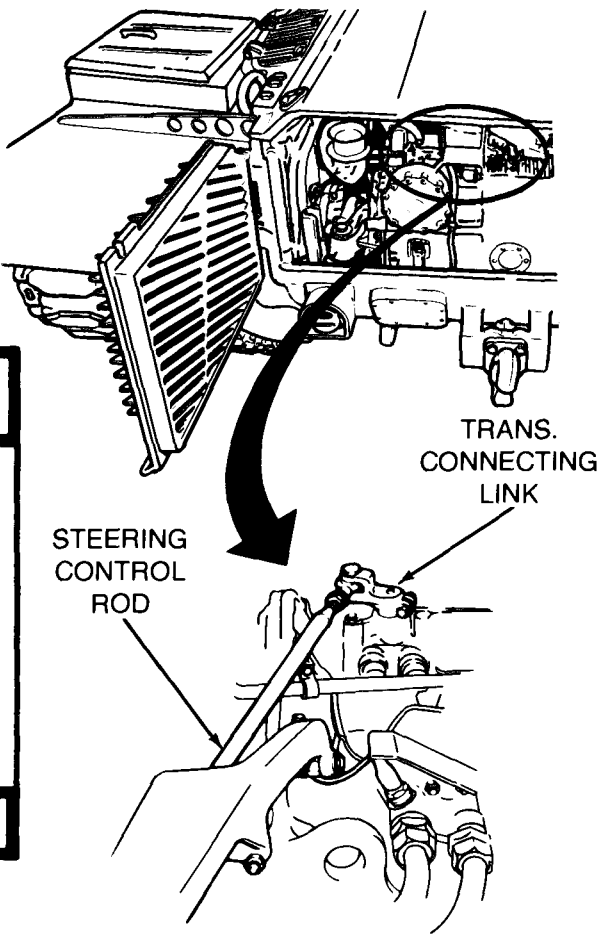
Does steering control linkage bind?

YES

NO

2 **• Check steering control position indicator for proper indications.**

• See Step (16) .

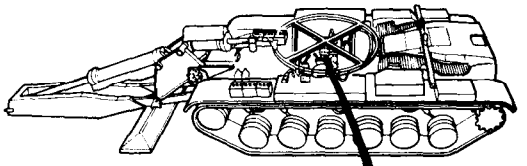


TA250248

Symptom-25

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



3 Check steering control handle assembly for binding or obstruction.

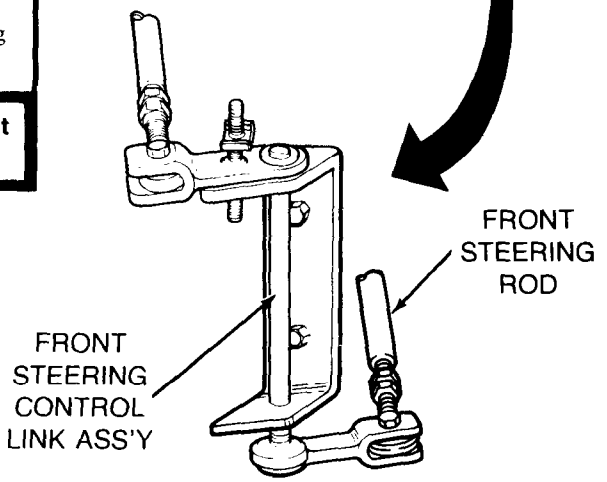
First Technician (Rear Grille Doors)

- Connect steering control rod to transmission connecting link assembly (page 15-27).

Second Technician (Operator's Station)

- Disconnect front steering control rod from front steering control link assembly (page 15-12).
- While holding disconnected control rod move steering control handle right and left.

Does steering control handle move smoothly without binding?



YES

NO

4

- **Remove, disassemble and inspect steering control handle and sleeve mount assembly (page 15-2 and 15-5).**
- **Install transmission shroud (page 9-6).**

TA250249

Symptom-25

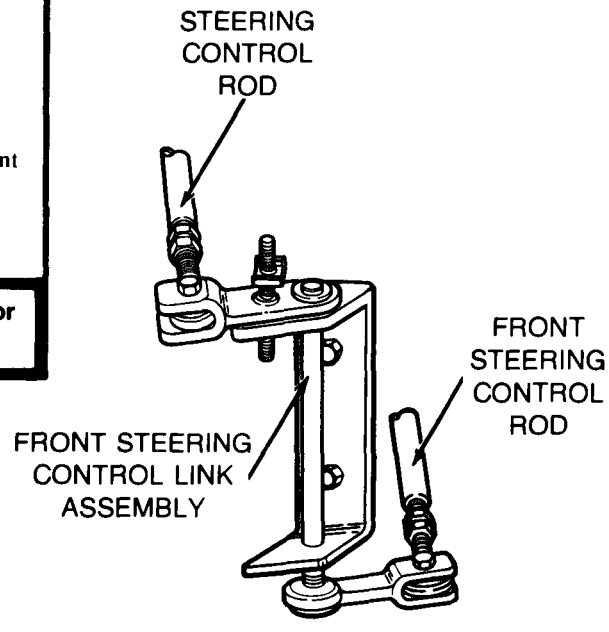
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)

5 **Check front steering control link assembly for binding or obstruction.**

Second Technician (Operator's Station)

- Connect front steering control rod to front steering control link assembly (page 15-14).
- Disconnect steering control rod from bottom of front steering control link assembly (page 15-12).
- Move steering control handle right and left.

Is front steering control link assembly obstructed or binding?



YES

6

- **Remove and inspect front steering control link assembly (page 15-7).**
- **Install transmission shroud (page 9-6).**

NO

TA250250

Symptom-25

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)

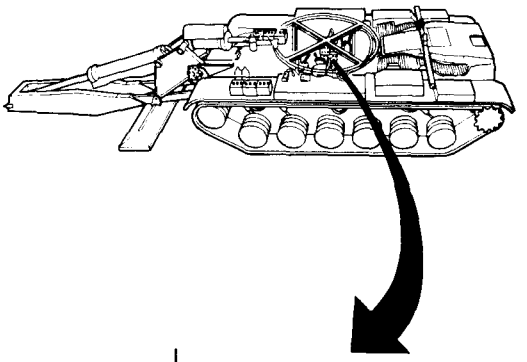
7 Check steering control intermediate link assembly for binding or obstruction.

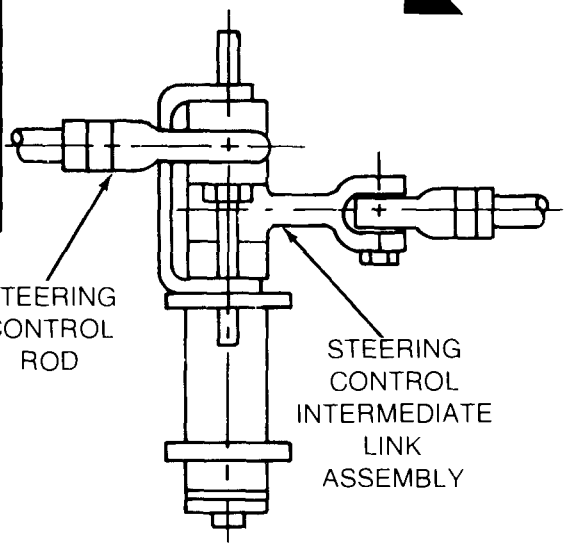
Second Technician (Operator's Station)

- Connect steering control rod to bottom of front steering control link assembly (page 15-14).
- Disconnect steering control rod from aft side of steering control intermediate link assembly (page 15-23).
- Move steering control handle right and left.

Is steering control intermediate link assembly obstructed or binding?

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN





NO

YES

8
- **Notify support maintenance if intermediate link assembly is binding.**
- **Remove any obstruction.**
- **Connect steering control rod to intermediate link assembly (page 15-25).**
- **Install transmission shroud (page 9-6).**

TA250251

Symptom-25

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)

9 **Check lower connecting rod for binding or obstruction.**

Second Technician (Operator's Station)

- Connect steering control rod to aft side of steering control intermediate link assembly (page 15-25).

First Technician (Top Deck)

- Open left rear top deck grille door.
- Remove inboard shield face from connecting link assembly (page 15-31).
- Disconnect connector rod from lower side of connector link assembly (page 15-31).

Second Technician (Operator's Station)

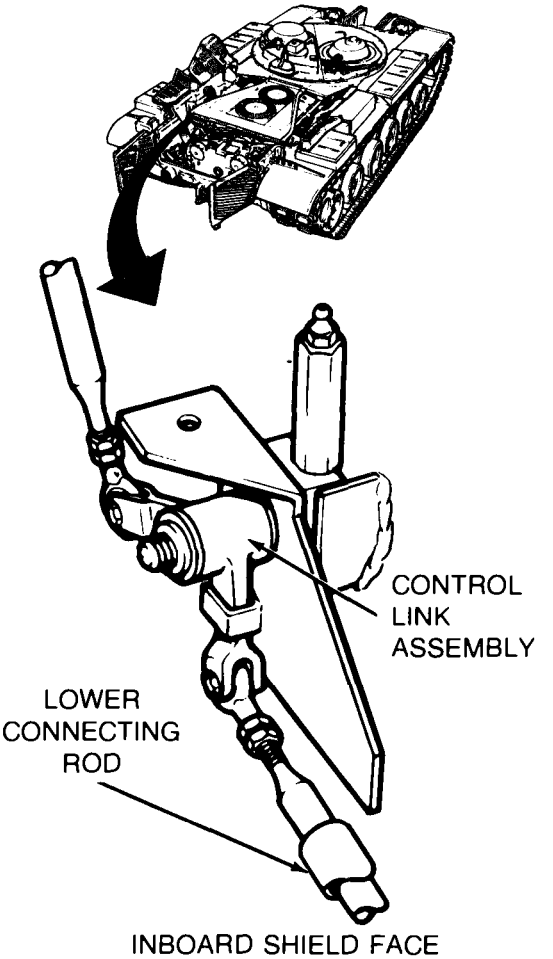
- Move steering control handle right and left

Is lower connecting rod obstructed or binding?

NO

YES

FOR CLARITY TOP DECK NOT SHOWN



INBOARD SHIELD FACE REMOVED FOR CLARITY

10

- **Notify support maintenance of steering control linkage problem.**
- **Reconnect connector rod to lower side of connector link assembly.**
- **Install inboard shield face (page 15-32).**
- **Install transmission shroud (page 9-6).**

TA250252

Symptom-25

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)

11 **Check connecting link assembly for binding or obstruction.**

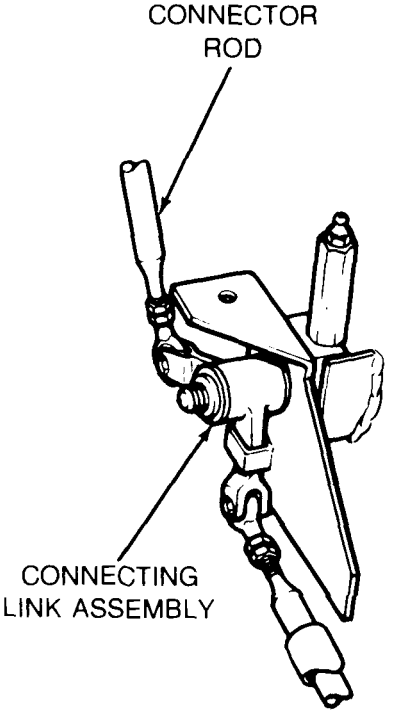
First Technician (Top Deck)

- Connect connector rod to lower side of connector link assembly (page 15-32).
- Disconnect connector rod from upper side of connector link assembly (page 15-31).

Second Technician (Operator's Station)

- Move steering control handle right and left.

Is connecting link assembly obstructed or binding?



NO

YES

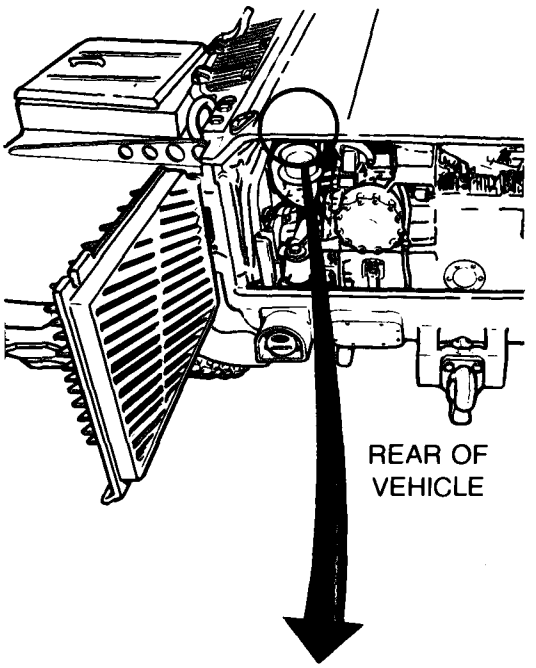
12

- **Remove, disassemble and inspect connecting link assembly (page 15-31).**
- **Install transmission shroud (page 9-6).**

TA250253

Symptom-25

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)



13 **Check riser connecting link assembly for binding or obstruction.**

First Technician (Top Deck)

- Connect connector rod to upper side of connecting link assembly (page 15-32).
- Install shield face on connecting link assembly (page 15-32).

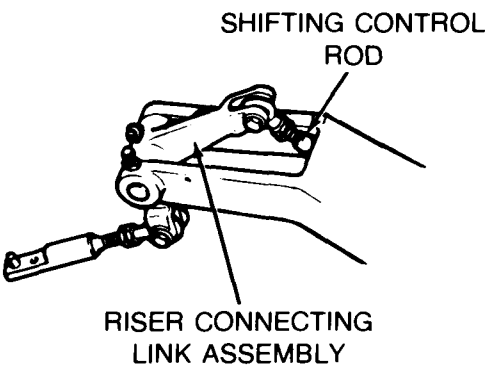
First Technician (Rear Grille Doors)

- Disconnect shifting control rod from upper side of riser connecting link assembly. (page 15-36).

Second Technician (Operator's Station)

- Move steering control handle right and left.

Is riser connecting link assembly obstructed or binding?



YES

14

- **Remove, disassemble and inspect the riser connecting link assembly (page 15-36).**

NO

15

- **Notify support maintenance of steering problem.**
- **Connect shifting control rod to upper side of riser connecting link assembly (page 15-38).**
- **Install transmission shroud (page 9-6).**

TA250254

Symptom-25

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)

FROM STEP

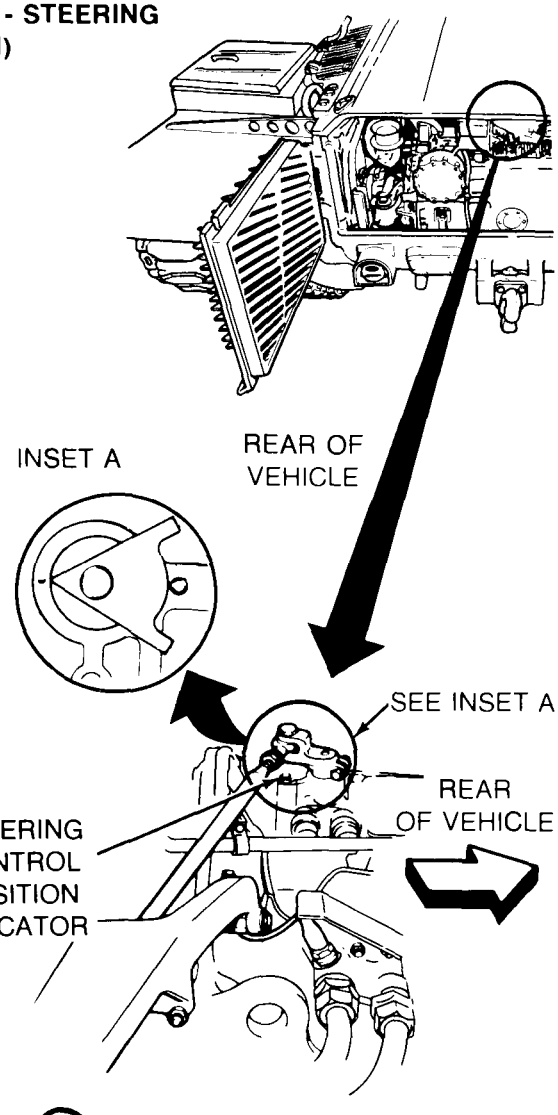
(2)

16 **Check steering control position indicator for proper indications.**

First Technician (Top Deck)

- Check steering position indicator on top of transmission. Indicator should point to center dimple.
- Move steering control valve link assembly to the right.
- Check that indicator points to (R).
- Move steering control valve link assembly to the left.
- Check that indicator points to (L).

Does steering position indicator show proper indications?



YES

17
- **Adjust steering control linkage (page 15-31).**
- **Connect steering control rod to transmission connecting link (page 15-38).**

NO

18
- **Notify support maintenance of steering problem.**
- **Connect steering control rod to transmission connecting link (page 15-38).**
- **Install transmission shroud (page 9-6).**

TA250255

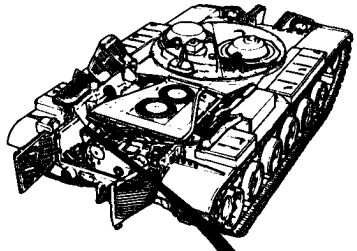
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING

Symptom-26

VEHICLE PIVOTS TO THE LEFT OR RIGHT.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



FOR CLARITY SHOWN WITH BACK DECK REMOVED

1 Check steering position indicator for correct indications.

Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

First Technician (Rear Grille Doors)

- With steering control not applied, check steering position indicator to see that it points to the center dimple.

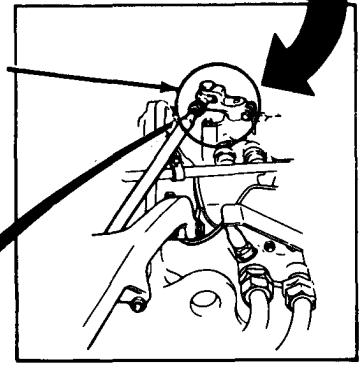
Second Technician (Operator's Station)

- Move steering control to the right and to the left.

First Technician (Rear Grille Doors)

- Check that position indicator moves to L then to R.

STEERING POSITION INDICATOR



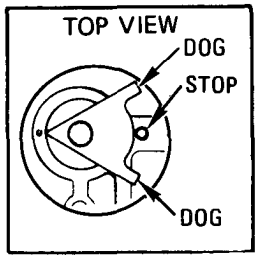
Does steering position indicator show correct position?

2

- **See Symptom 25: VEHICLE WILL NOT STEER PROPERLY.**

NO

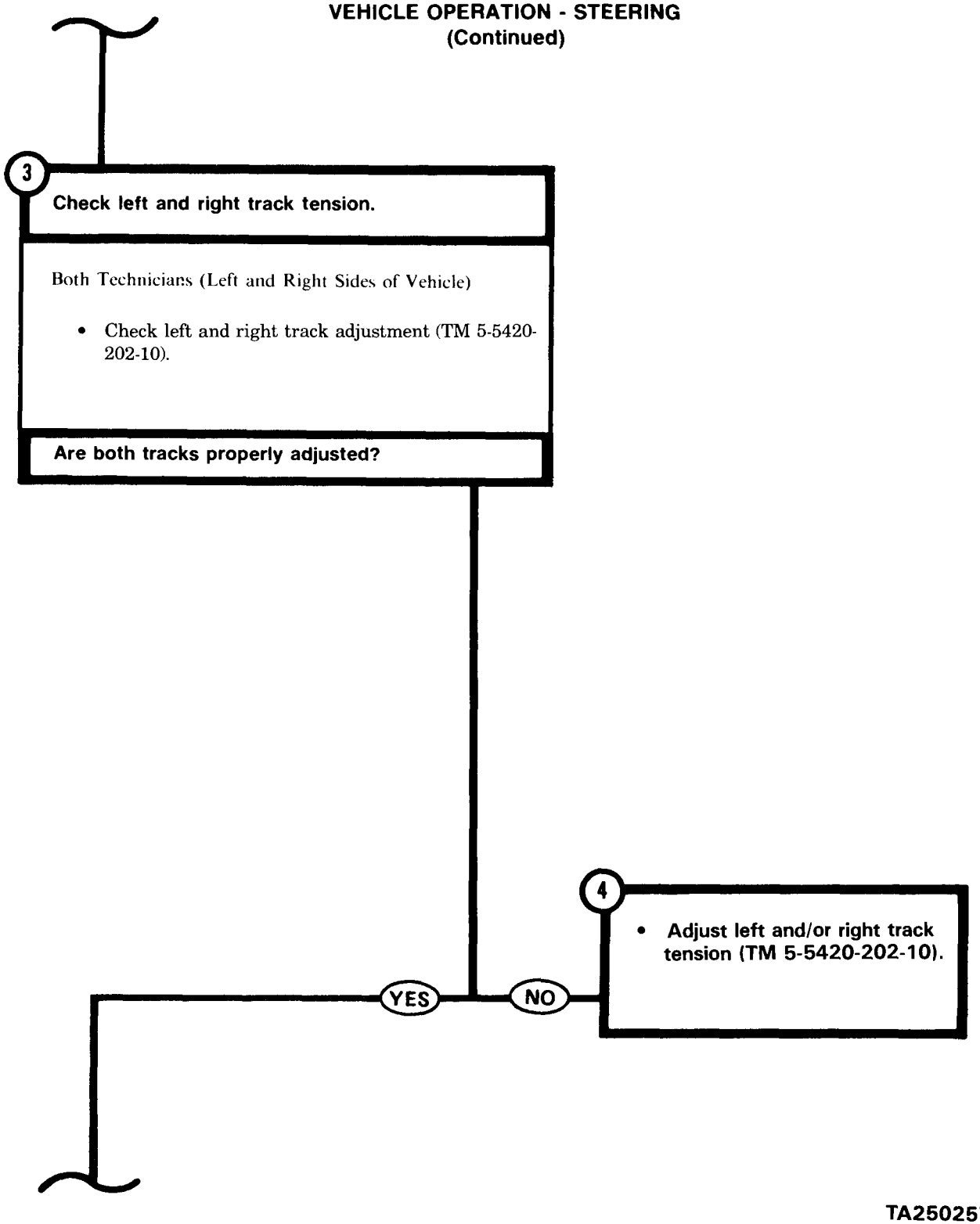
YES



TA250256

Symptom-26

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)



TA250257

Symptom-26

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)

5 **Check service brake for adjustment.**

Both Technicians (Left and Right Side of Vehicle)

- Block tracks to prevent movement of vehicle.

First Technician (Rear Grille Doors)

- Remove lockwires and plugs (one located on each side of transmission rear housing) from brake inspection holes.

Second Technician (Operator's Station)

- Press brake pedal and hold when pressure of 750 to 900 psi is reached.

First Technician (Rear Grille Doors)

- Check if index line marked "A" (Applied) aligns within 1/64 inch of chiseled line located on edge of brake anchor.

Second Technician (Operator's Station)

- Release brakes.

First Technician (Rear Grille Doors)

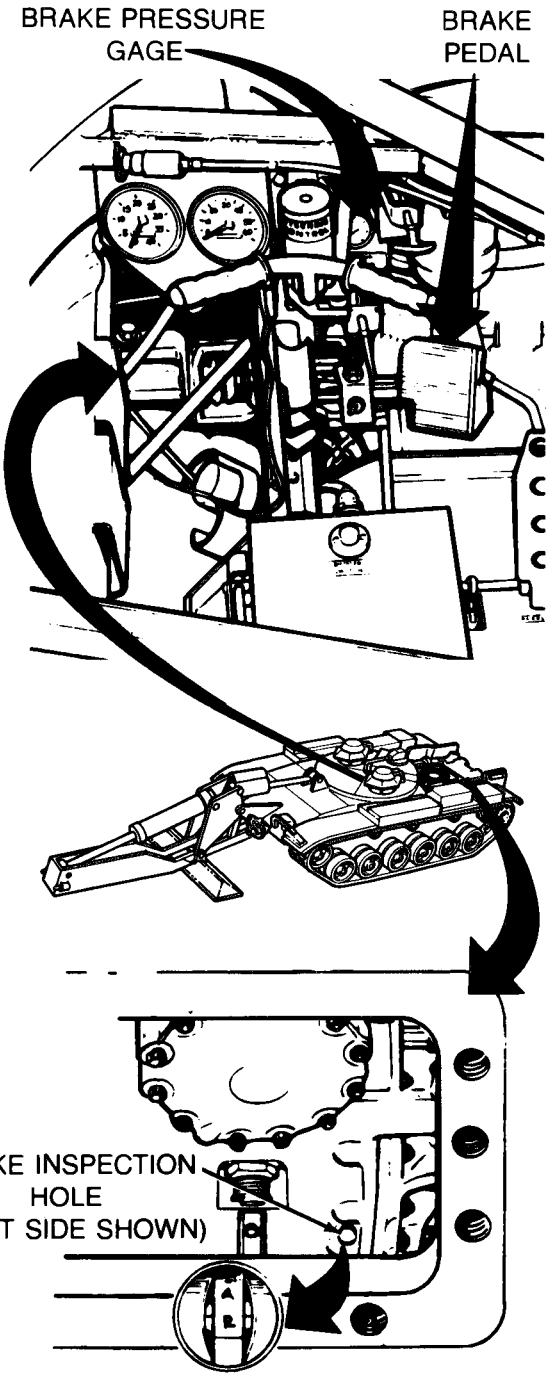
- Check if index line marked "R" (Released) alines within 1/64 inch of chiseled line located on edge of brake anchor.

Are service brakes properly adjusted?

6 **• Adjust service brakes (page 13-78).**

NO

YES



TA250258

Symptom-26

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)

7 **Check universal joints for damage.**

Both Technicians (Rear Grille Doors)

- Install plugs in brake inspection holes and lockwire.
- Remove left or right universal joint (page 12-15).
- Disassemble universal joint (page 12-22).
- Check universal joint for excessive wear, broken parts, or other damage.

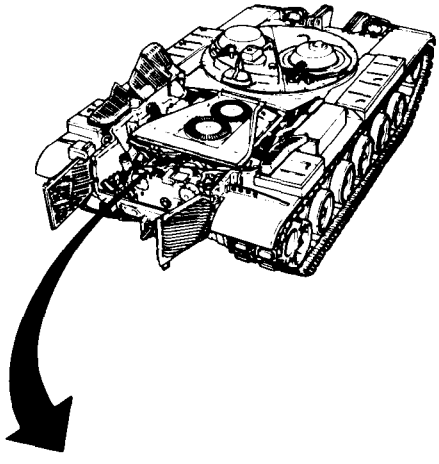
Are universal joints worn, broken or damaged?

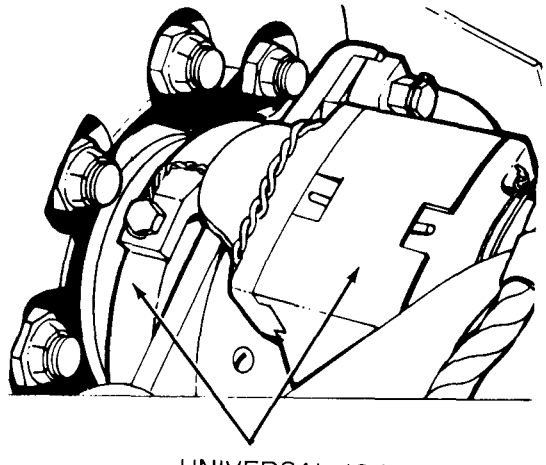
YES

8

- **Replace universal joint (page 12-18).**

NO





UNIVERSAL JOINT
(LEFT SIDE SHOWN)

TA250259

Symptom-26

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - STEERING
(Continued)

9 **Check final drive input shafts for breaks or damage.**

Both Technicians (Rear Grille Doors)

- Remove right or left input shaft adapter (page 12-7).
- Check final drive input shaft for broken or damaged condition.

Is final drive input shaft broken or damaged?

10

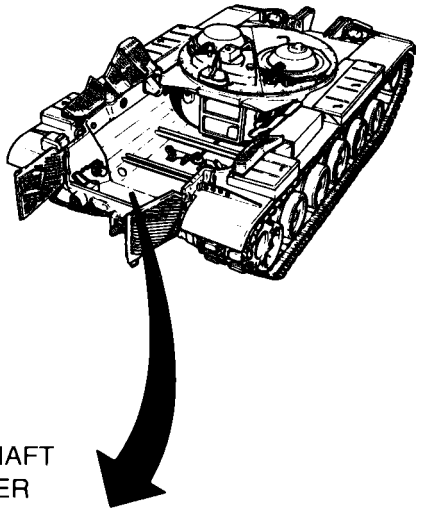
- **Replace final drive (page 12-2).**

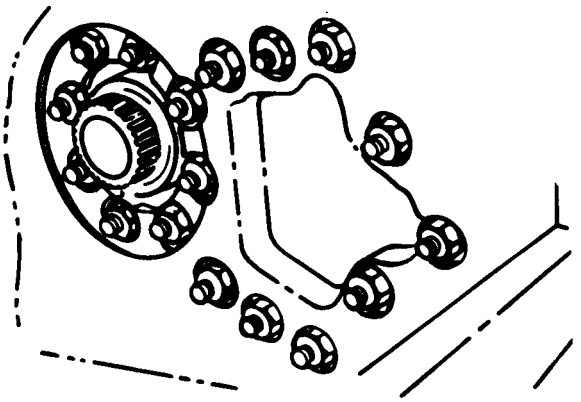
YES

11

- **Install input shaft adapter (page 12-8).**
- **Install universal joint (page 12-18).**
- **Notify support maintenance of steering problem.**

NO





FINAL DRIVE INPUT SHAFT
(RIGHT SIDE SHOWN
POWERPLANT REMOVED
FOR CLARITY)

TA250260

DETAILED TROUBLESHOOTING PROCEDURE

Symptom-27 **VEHICLE OPERATION-HULL POWER**

NO POWER DISTRIBUTION FROM MASTER RELAY (MASTER BATTERY INDICATOR LAMP WILL LIGHT).

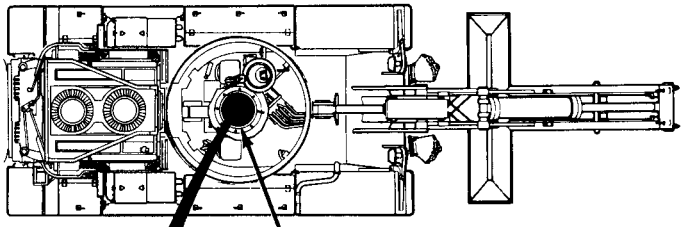
WARNING

Use extreme care when working with circuit 81. This circuit carries battery voltage at all times, whether MASTER BATTERY switch is ON or OFF.

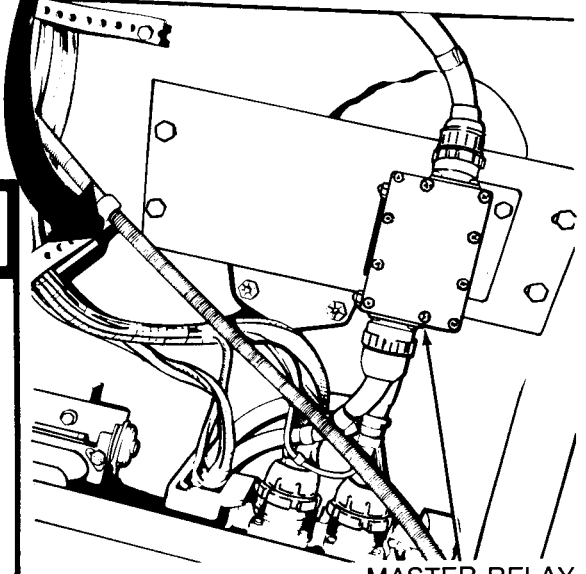
NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



MASTER RELAY (UNDER FLOOR ACCESS COVER)



MASTER RELAY FOR CLARITY ACCESS COVER REMOVED

1 **Listen for clicking sound from MASTER RELAY when MASTER BATTERY switch is set ON.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- If master relay is working, a click should be heard from master relay.
- Set MASTER BATTERY switch OFF and ON several times, listening for clicking sound.

Can clicking sound be heard?

YES

NO

2

- **Check for electrical power to coil of master relay (CKT 459A).**
- **See Step (8).**

TA250261

Symptom-27

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

3 Check for electrical power at output of MASTER RELAY (CKT 81-5).

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Remove floor access cover (page 17-7).
- Disconnect hull power harness connector (CKT 81-5) from master relay.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to center contact of master relay connector (CKT 81-5) and black probe to ground.

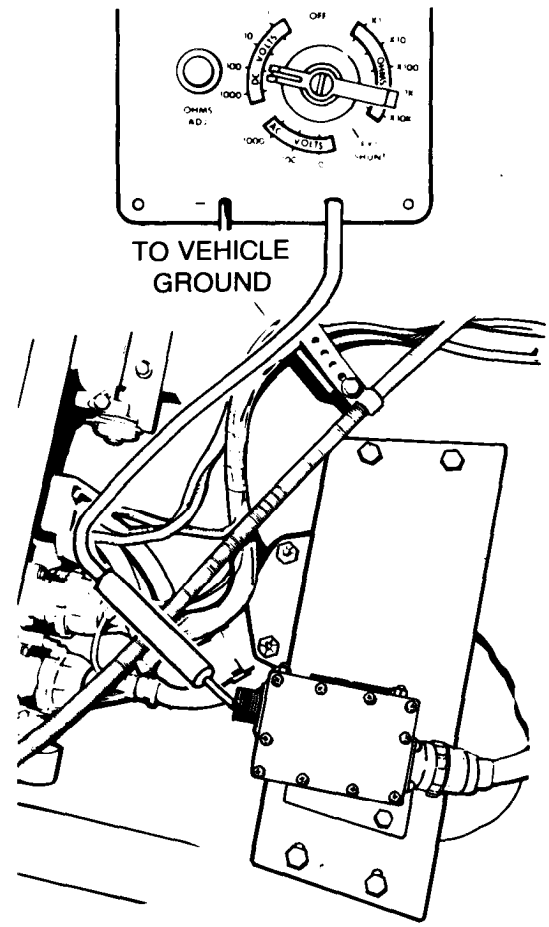
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



NO

YES

4

- **Check hull power harness (CKT 10) at basket disconnect for electrical power.**

- **See Step (17)**

TA250262

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

Symptom-27

5 **Check for electrical power at input to MASTER RELAY (CKT 81).**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

WARNING
After disconnecting ground straps, do not allow them to contact any metal surface.

Second Technician (Front of Crew Compartment)

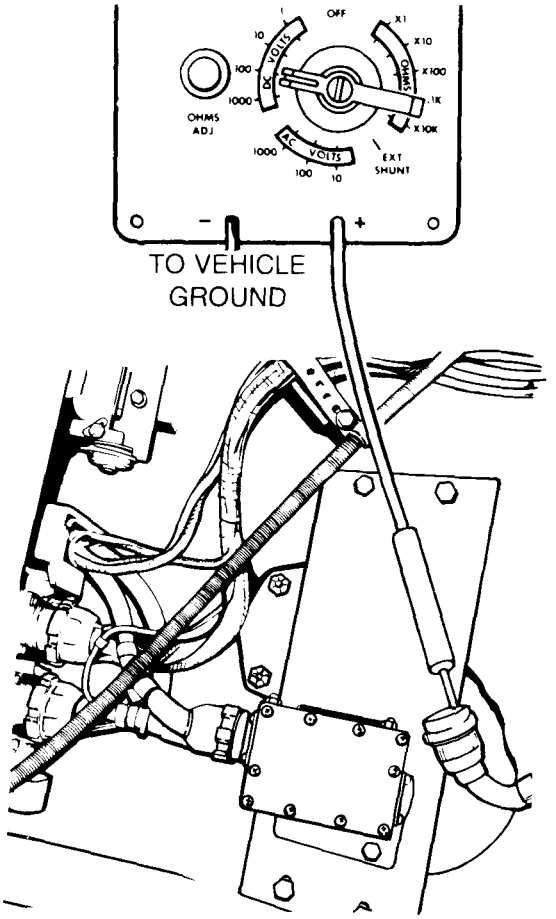
- Disconnect three battery ground straps (page 10-268).

First Technician (Commander's Station)

- Connect hull power harness connector to master relay.
- Disconnect battery cable connector (CKT 81) from master relay.
- Connect red probe of meter to center contact of battery cable connector (CKT 81) and black probe to ground.

Second Technician (Front of Crew Compartment)

- Connect three battery ground straps (page 10-268).



TA250263

Symptom-27

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - POWERPLANT, STARTING
(Continued)

STEP (5) CONTINUED

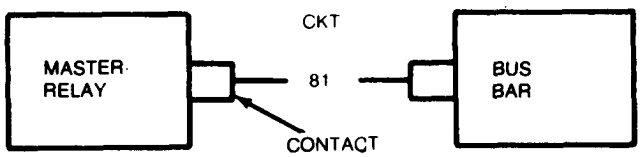
First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

YES → (6) **Replace master relay (page 10-138).**

NO → (7) **Repair battery cable (page 10-298).**



TA250264

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

Symptom-27

FROM STEP (2)

8 Check for electrical power to coil of master relay (CKT 459A).

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Remove floor access cover (page 17-7).
- Disconnect reverse polarity protection device connector (CKT 459A) from master relay.
- Set meter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to center contact of reverse polarity protection device connector (CKT 459A) and black probe to ground.

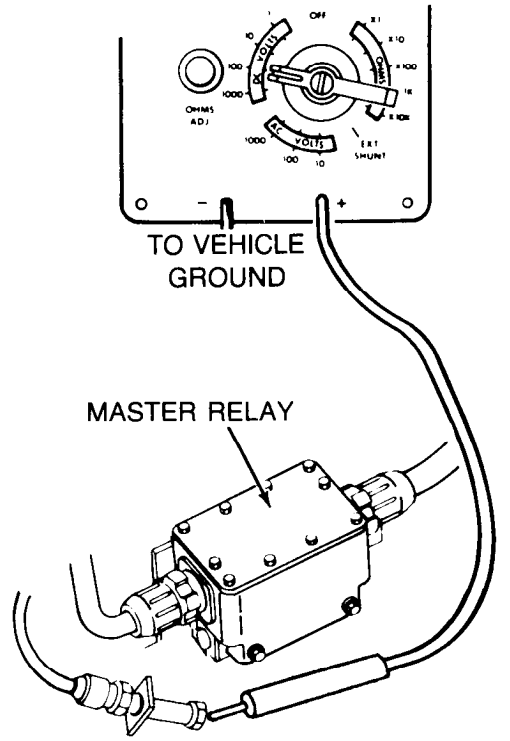
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



NO

YES

9 Replace master relay (page 10-138).

TA250265

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

Symptom-27

10 Check front accessory harness connector (CKT 459A) at reverse polarity protection device for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

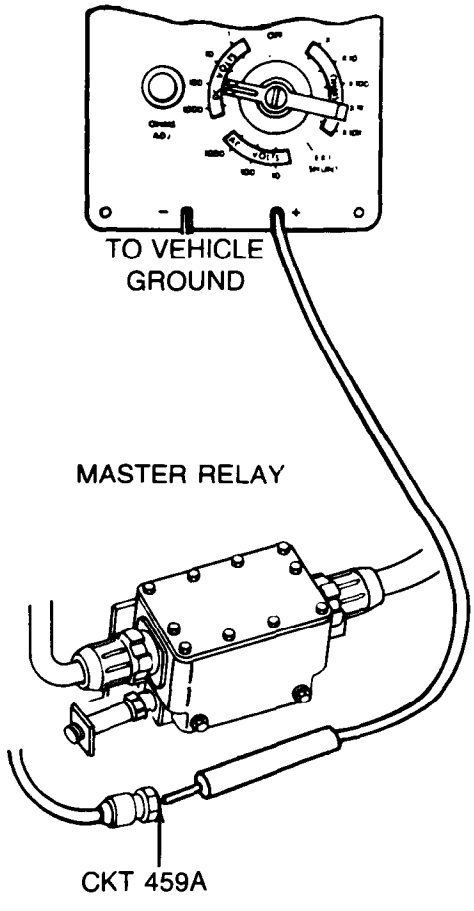
- Reconnect reverse polarity protection device to master relay.
- Disconnect front accessory harness connector (CKT 459A) from reverse polarity protection device.
- Connect red probe of meter to center contact of front accessory harness connector (CKT 459A) and black probe to ground.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.



Does meter indicates 18 to 30 volts dc?

YES

11
- **Replace reverse polarity protection device (page 10-139).**

NO

TA250266

Symptom-27

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

12 **Check basket-control panel starting harness connector (CKT 459A) at basket disconnect for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Displace basket-control panel starting harness connector (CKT 459A) at basket disconnect.
- Connect red probe of meter to contact E (CKT 459A) of basket-control panel starting harness connector and black probe to ground.

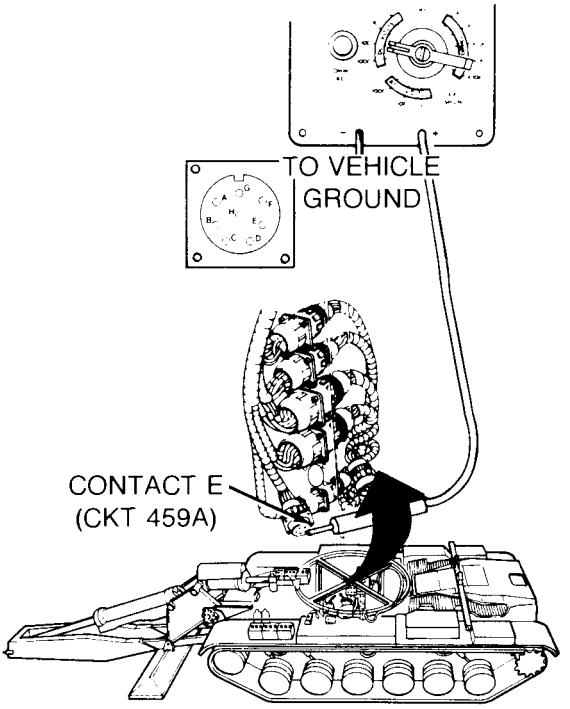
Second Technician (Operator's Station)

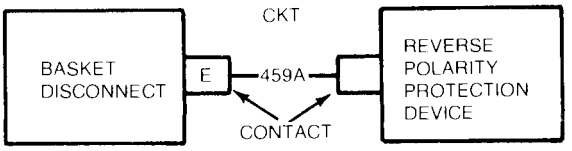
- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?





NO

YES

13

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 459A wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Install basket-control panel starting harness connector to basket disconnect.**
- **Connect front accessory harness connector to reverse polarity protection device.**
- **Install floor access cover (page 17-7).**

TA250267

Symptom-27 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - HULL POWER
(Continued)

14 **Check starting harness connector (CKT 459A) at master control panel for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).

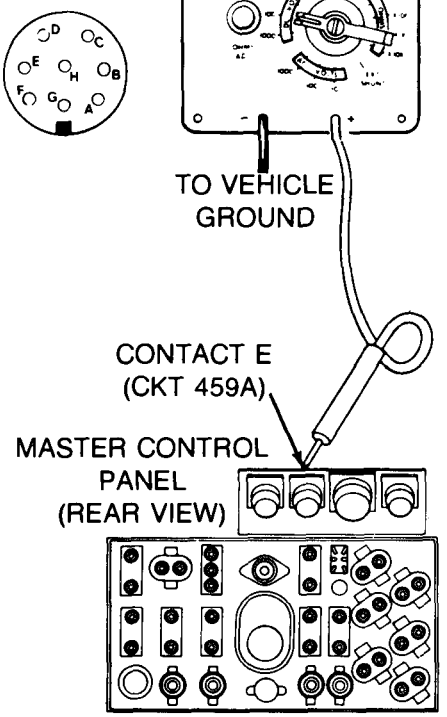
First Technician (Commander's Station)

- Install basket-control panel starting harness at basket disconnect.
- Connect front accessory harness connector (CKT 459A) to master relay.
- Install floor access cover (page 17-7).

Second Technician (Operator's Station)

- Disconnect basket-control panel starting harness connector (CKT 459A) from master control panel.
- Connect red probe of meter to contact E (CKT 459A) of control panel starting harness connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

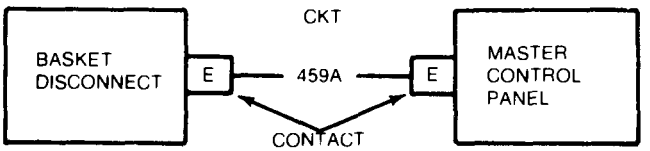


15
- **Replace master control panel starting harness (page 10-97).**
- **Connect basket-control panel starting harness connector at master control panel.**
- **Install master control panel (page 10-33).**

NO

YES

16
- **Inspect basket-control panel starting harness for bent/broken connector contacts or loose CKT 459A wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-control panel starting harness.**
- **Install master control panel (page 10-33).**

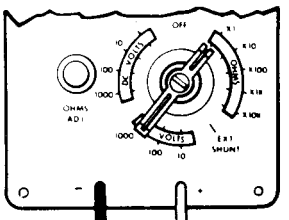


TA250268

Symptom-27

FROM STEP (4)

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)



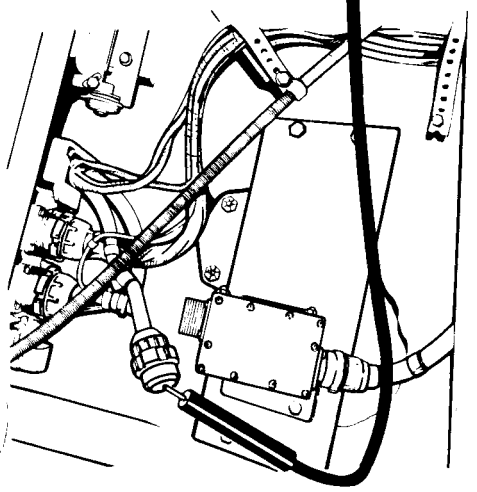
(17) Check hull power harness (CKT 10) for continuity.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Set multimeter to OHMS X1 scale and zero meter or use STE/ICE Test No. 91 (page 4-83).
- Disconnect hull power harness connector (CKT 10) from basket disconnect.
- Connect red probe of meter to contact B (CKT 10) of hull power harness connector at basket disconnect.
- Connect black probe of meter to center contact of hull power harness connector (CKT 81-5) at master relay.
- Check if meter indicates continuity.



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

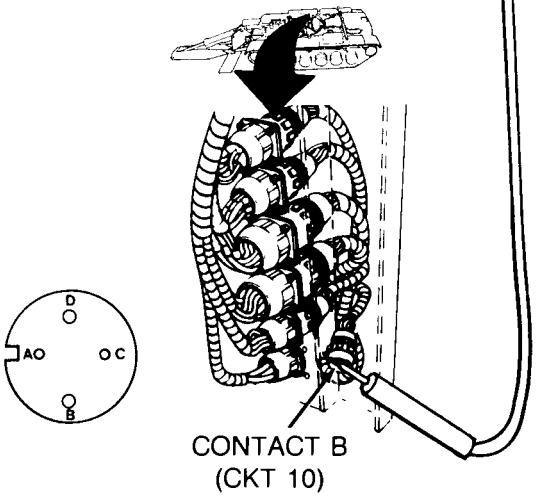
Does meter indicate continuity?

NO

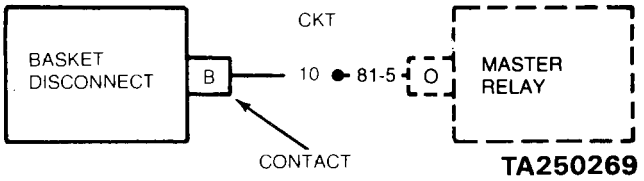
(18)

- **Inspect hull power harness for bent/broken connector contacts or loose CKT 10 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective hull power harness.**
- **Connect hull power harness connector to basket disconnect and master relay.**
- **Install floor access cover (page 17-7).**

YES



CONTACT B (CKT 10)



TA250269

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - INDICATORS
(Continued)

Symptom-27

19 **Check basket-control panel power harness (CKT 10) for continuity.**

First Technician (Commander's Station)

- Connect hull power harness to master relay.
- Replace floor access cover (page 17-7).
- Displace basket-control panel power harness connector at basket disconnect.

Second Technician (Operator's Station)

- Displace master control panel (page 10-33).
- Disconnect basket-control panel power harness connector (CKT 10) at master control panel.
- Connect red probe of meter to contact B (CKT 10) of basket-control panel power harness connector at master control panel.

First Technician (Commander's Station)

- Connect black probe of meter to contact B (CKT 10) of basket-control panel power harness connector at basket disconnect.
- Check if meter indicates continuity.

Does meter indicate continuity?

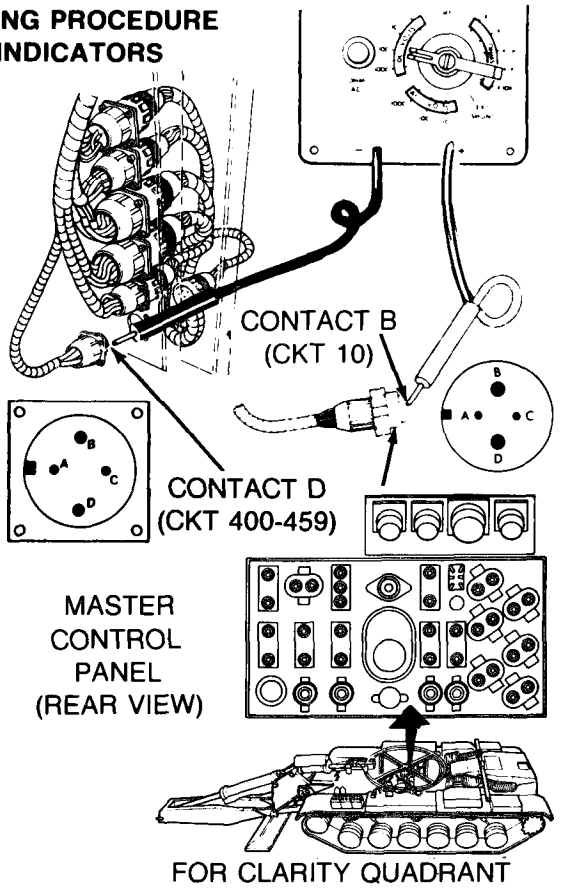
YES

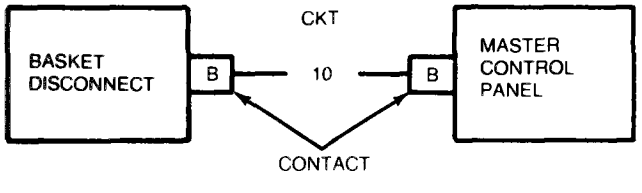
20 **Replace master control panel power harness (page 10-97).**

NO

21

- **Inspect basket-control panel power harness for bent/ broken connector contacts or loose CKT 10 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-control panel power harness.**
- **Connect basket-control panel power harness connector to master control panel.**
- **Reinstall master control panel (page 10-33).**
- **Install basket-control panel power harness at basket disconnect.**





TA250270

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER

Symptom-28

NO POWER IN VEHICLE (MASTER BATTERY INDICATOR LAMP WILL NOT LIGHT).

WARNING

Use extreme care when working with circuit 49. This circuit carries battery voltage at all times, whether MASTER BATTERY switch is ON or OFF.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 **Check CKT 49 at slave receptacle for electrical power.**

First Technician (Commander's Station)

- Displace protective cap from one slave receptacle.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).

WARNING

Do not allow red probe of meter to touch positive (+) contact and outer surface of slave receptacle at the same time.

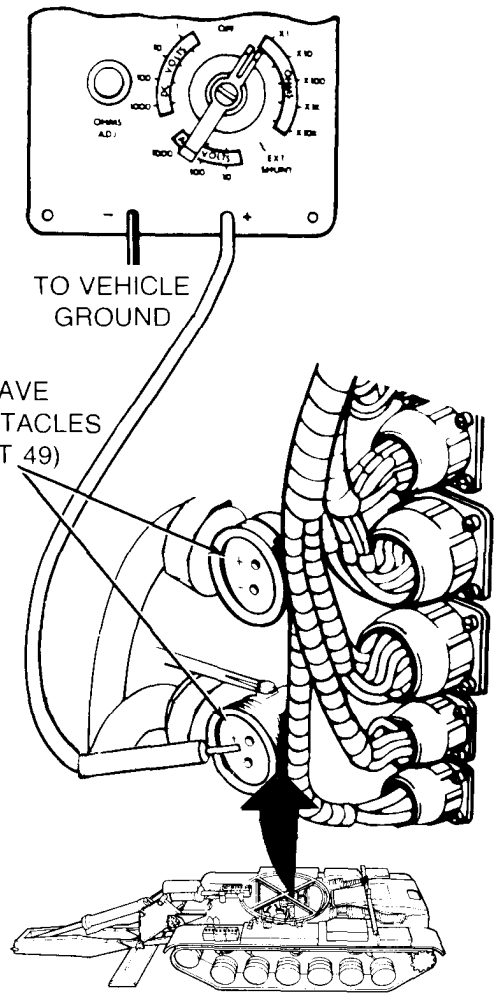
- Connect red probe of meter to positive (+) contact (CKT 49) of slave receptacle and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

YES — (proceed)

NO — **2**

- **Service batteries (page 10-258).**
- **Charge batteries (TM 9-6140-200-14).**
- **Install slave receptacle protective cap.**



TA250271

Symptom-28

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

WARNING

Use extreme care when working with circuit 459. This circuit carries battery voltage at all times, whether MASTER BATTERY switch is ON or OFF.

WARNING

After disconnecting ground straps, do not allow them to contact any metal surface.

3 Check MASTER BATTERY switch for continuity.

First Technician (Commander's Station)

- Install slave receptacle protective cap.
- Disconnect three battery ground straps (page 10-268).

Second Technician (Operator's Station)

- Displace master control panel (page 10-33).
- Set MASTER BATTERY switch ON.
- Disconnect control panel power harness connector (CKT 459) from MASTER BATTERY switch.
- Disconnect control panel starting harness connector (CKT 459A) from MASTER BATTERY switch.
- Set meter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to one contact of MASTER BATTERY switch.
- Connect black probe of meter to other contact of MASTER BATTERY switch.
- Check if meter indicates continuity.

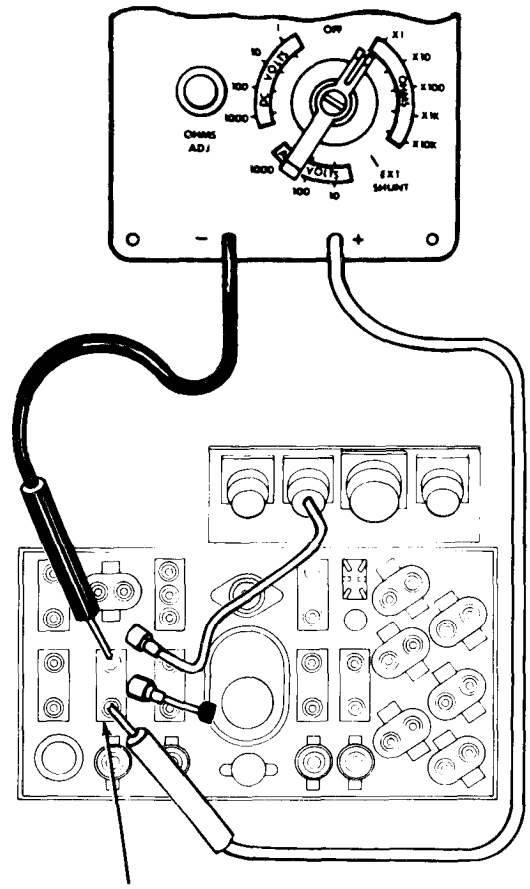
Does meter indicate continuity?

YES

NO

4

- **Replace MASTER BATTERY switch (page 10-43).**
- **Connect three battery ground straps (page 10-268).**



MASTER CONTROL PANEL
(REAR VIEW)

TA250272

Symptom-28

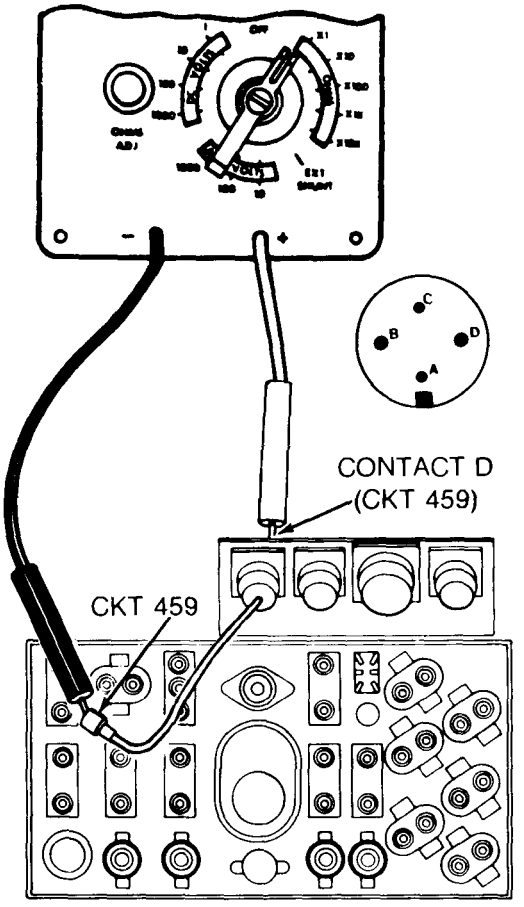
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

5 **Check CKT 459 in control panel power harness for continuity.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect basket-control panel power harness connector from master control panel.
- Connect red probe of meter to contact D (CKT 459) of control panel power harness panel connector.
- Connect black probe of meter to control panel power harness connector at MASTER BATTERY switch (CKT 459).
- Check if meter indicates continuity.

Does meter indicate continuity?



MASTER CONTROL PANEL
(REAR VIEW)

YES

NO

6

- **Replace control panel power harness (page 10-101).**
- **Connect control panel starting harness connector to MASTER BATTERY switch.**
- **Connect three battery ground straps (page 10-268).**

TA250273

Symptom-28

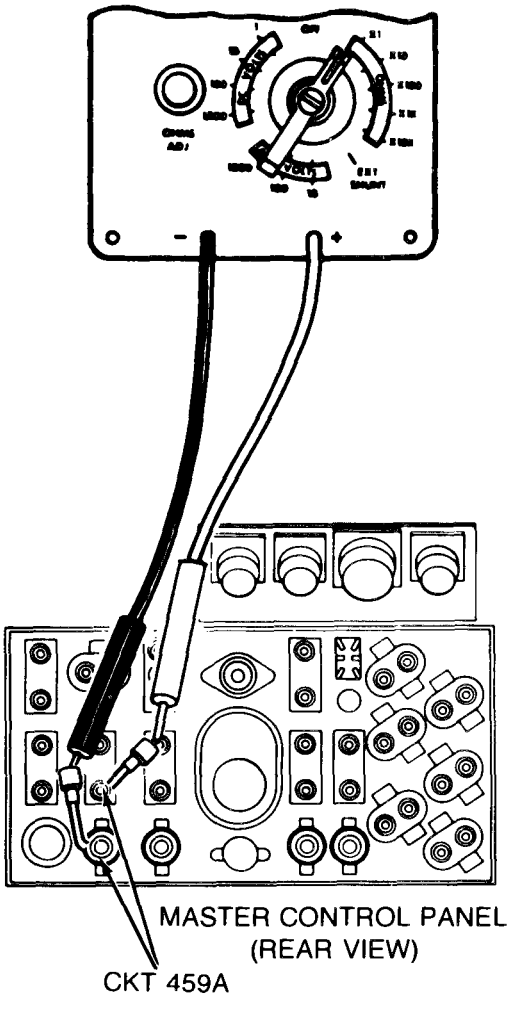
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

7 **Check CKT 459A in control panel starting harness for continuity.**

Second Technician (Operator's Station)

- Disconnect control panel starting harness connector (CKT 459A) from MASTER BATTERY indicator lamp.
- Connect red probe of meter to control panel starting harness connector (CKT 459A) at MASTER BATTERY switch.
- Connect black probe of meter to control panel starting harness connector (CKT 459A) at MASTER BATTERY indicator lamp.
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

NO

8
- **Replace control panel starting harness (page 10-97).**
- **Reconnect basket-control panel power harness to master control panel.**
- **Connect control panel power harness connector to MASTER BATTERY switch.**
- **Connect three battery ground straps (page 10-268).**

TA250274

Symptom-28

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

9 **Check master relay circuit breaker for continuity.**

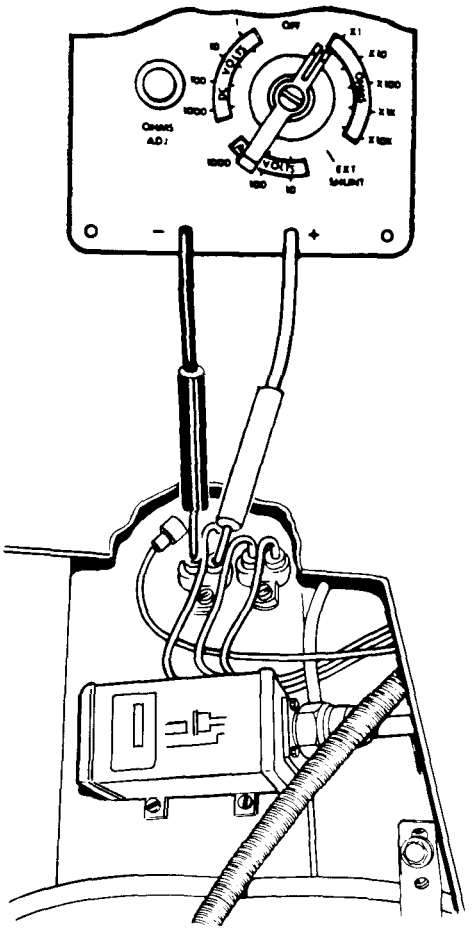
Second Technician (Operators Station)

- Connect control panel starting harness connector (CKT 459A) to MASTER BATTERY indicator lamp.
- Connect control panel starting harness connector (CKT 459A) to MASTER BATTERY switch.
- Connect control panel power harness connector (CKT 459) to MASTER BATTERY switch.

First Technician (Commander's Station)

- Remove floor access cover located in front of commander's seat (page 17-7).
- Disconnect both hull power harness connectors (CKT 400-459) from master relay circuit breaker.
- Connect red probe of meter to one contact of master relay circuit breaker.
- Connect black probe of meter to other contact of master relay circuit breaker.
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

NO

10

- **Replace master relay circuit breaker (page 10-165).**
- **Connect basket-control panel power harness connector to master control panel.**
- **Connect three battery ground straps (page 10-268).**
- **Install master control panel (page 10-33).**

TA250275

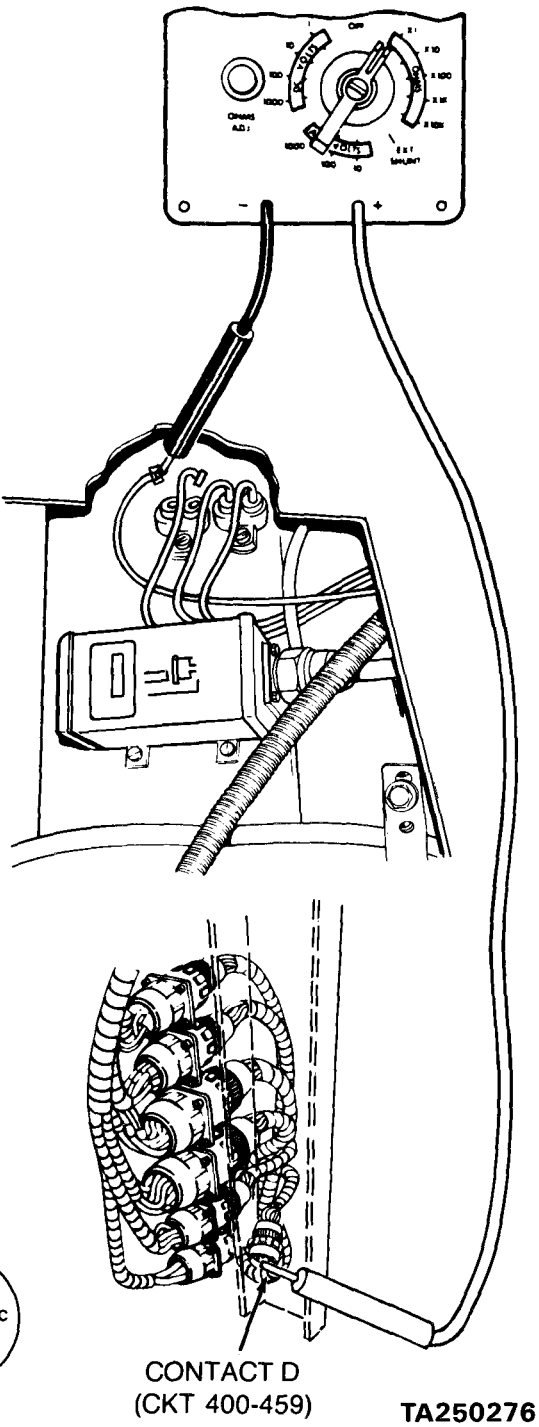
Symptom-28

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

11 **Check hull power harness (CKT 400-459) from master relay circuit breaker to basket disconnect for continuity.**

First Technician (Commander's Station)

- Disconnect hull power harness connector (CKT 400-459) from basket disconnect.
- Connect red probe of meter to contact D (CKT 400-459) of hull power harness connector at basket disconnect.
- Connect black probe of meter to one CKT 400-459 connector at master relay circuit breaker.
- Check if meter indicates continuity.
- Move black probe of meter to other CKT 400-459 connector at master relay circuit breaker.



TA250276

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

Symptom-28

STEP (11) CONTINUED

- Check if meter indicates continuity.

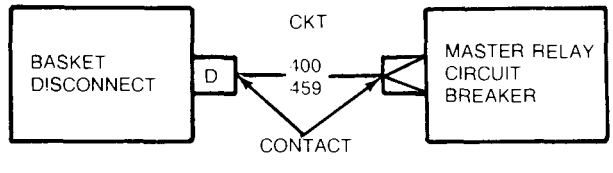
Does meter indicate continuity at one of the harness connectors to master relay circuit breaker?

YES

NO

(12)

- **Inspect hull power harness for bent/broken connector contacts or loose CKT 400-459 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective notify support maintenance of bad hull power harness.**
- **Connect hull power harness connectors to master relay circuit breaker.**
- **Install floor access cover (page 17-7).**
- **Connect basket-control panel power harness to master control panel.**
- **Connect hull power harness connector to basket disconnect.**
- **Connect three battery ground straps (page 10-268).**
- **Install master control panel (page 10-33).**



TA250277

Symptom-28

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

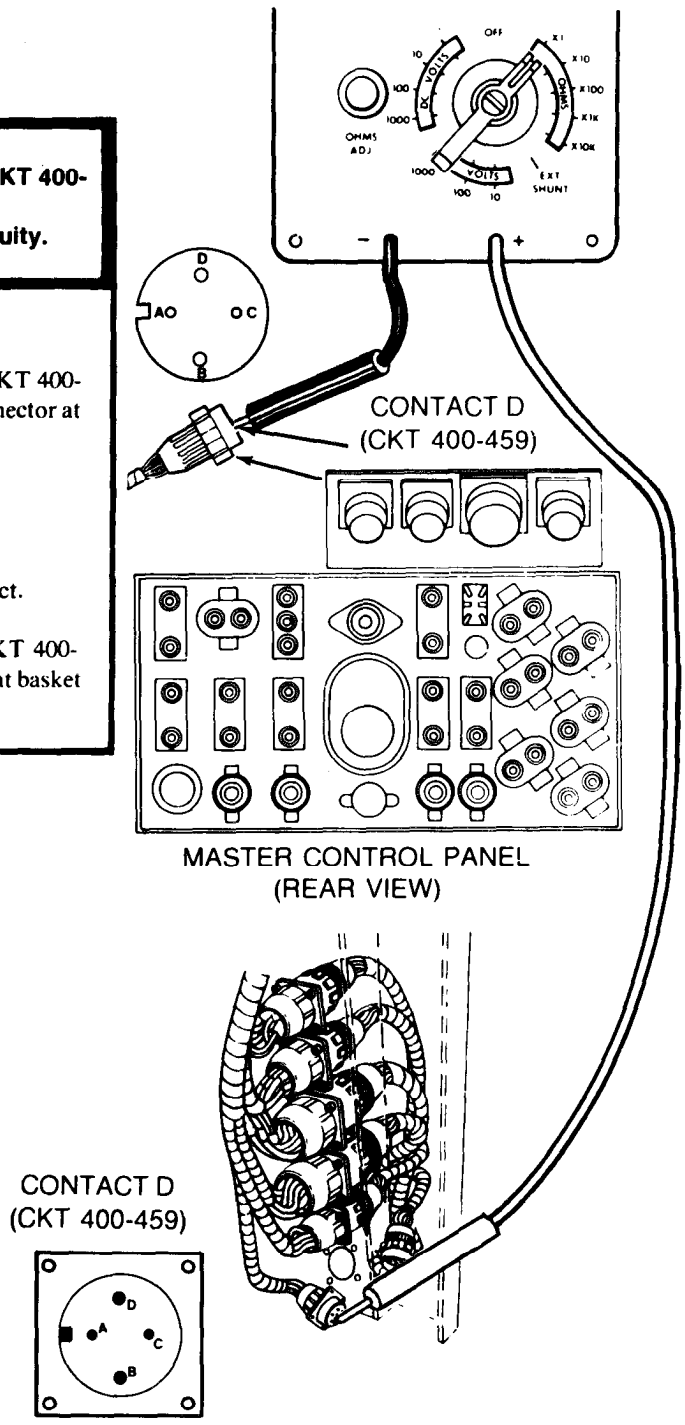
13 **Check basket-control panel power harness (CKT 400-459) from connector at basket disconnect to connector at master control panel for continuity.**

Second Technician (Operator's Station)

- Connect black probe of meter to contact D (CKT 400-459) of basket-control panel power harness connector at master control panel.

First Technician (Commander's Station)

- Displace basket-control panel power harness connector (CKT 400-459) at basket disconnect.
- Connect red probe of meter to contact D (CKT 400-459) of basket-control panel harness connector at basket disconnect.



TA250278

Symptom-28

STEP (13) CONTINUED

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

- Check if meter indicates continuity.

Does meter indicate continuity?

YES

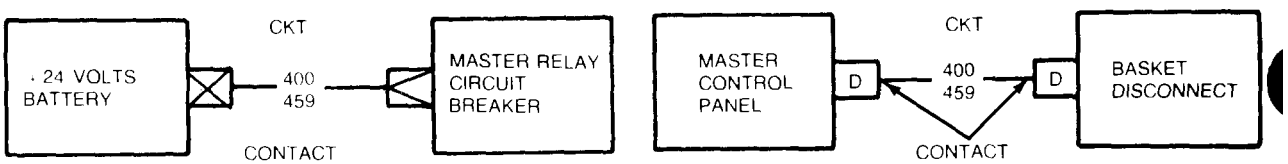
14

- **Inspect hull power harness from battery to master relay circuit breaker for bent/ broken connector contacts or loose CKT 400-459 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of bad hull power harness.**
- **Connect hull power harness connectors to master relay circuit breaker.**
- **Install floor access cover (page 17-7).**
- **Connect three battery ground straps (page 10-268).**
- **Install basket-control panel power harness connector at basket disconnect.**
- **Connect basket-control panel power harness connector to master control panel.**
- **Install master control panel (page 10-33).**

NO

15

- **Inspect basket-control panel power harness for bent/ broken connector contacts or loose CKT 400-459 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of bad basket-control panel power harness.**
- **Connect hull power harness connectors to master relay circuit breakers.**
- **Install floor access cover (page 17-7).**
- **Install basket-control panel power harness connector at basket disconnect.**
- **Connect basket-control panel power harness connector to master control panel.**
- **Install master control panel (page 10-33).**
- **Connect three battery ground straps (page 10-268).**



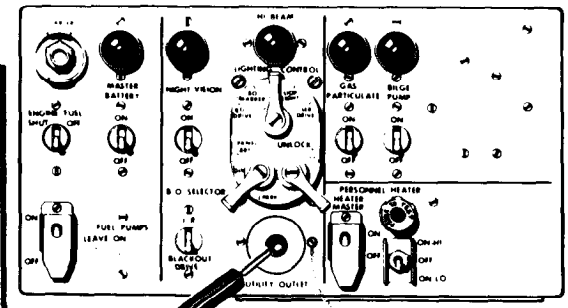
TA250279

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER

Symptom-29

NO POWER AT UTILITY OUTLET ON MASTER CONTROL PANEL.

MASTER CONTROL PANEL

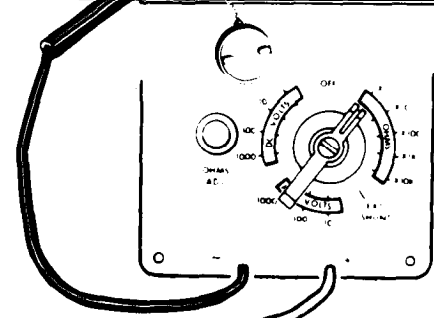


1 Check from connector at utility outlet circuit breaker (CKT 37) to UTILITY OUTLET for continuity.

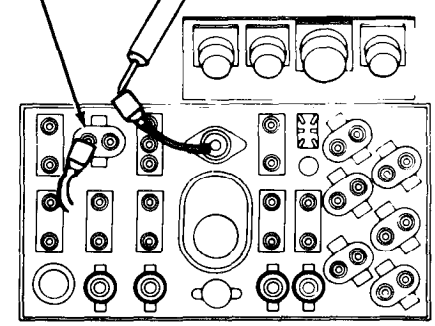
Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Unscrew cap from UTILITY OUTLET.
- Disconnect UTILITY OUTLET lead (CKT 37) from utility outlet circuit breaker.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to UTILITY OUTLET lead disconnected from circuit breaker.
- Connect black probe to center contact of UTILITY OUTLET at front of master control panel.
- Check if meter indicates continuity.

Does meter indicate continuity?



UTILITY OUTLET CIRCUIT BREAKER



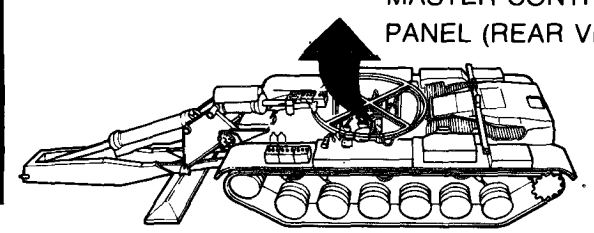
MASTER CONTROL PANEL (REAR VIEW)

2

- **Replace UTILITY OUTLET assembly (page 10-60).**

NO

YES



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

TA250280

Symptom-29

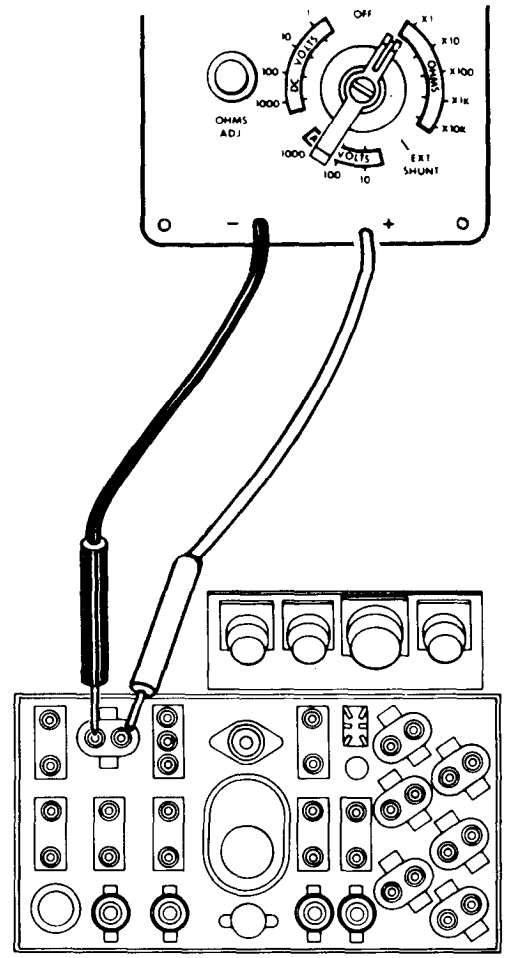
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

3 **Check utility outlet circuit breaker for continuity.**

Technician (Operator's Station)

- Replace cap on UTILITY OUTLET.
- Disconnect master control panel power harness connector (CKT 37) from utility outlet circuit breaker.
- Connect one meter probe to each disconnected utility outlet circuit breaker connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

4
- **Replace master control panel power harness (page 10-101).**
- **Reconnect UTILITY OUTLET lead (CKT 37) to utility outlet circuit breaker.**

NO

5 **Replace utility outlet circuit breaker (page 10-70).**

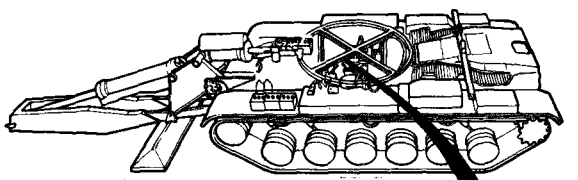
TA250281

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER

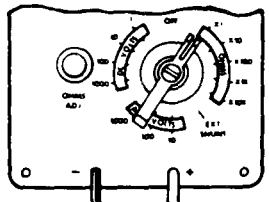
Symptom-30

NO POWER AT SLAVE RECEPTACLE (MASTER BATTERY LAMP LIGHTS).

CAUTION
Do not touch positive (+) socket of slave receptacle with multimeter probes when multimeter is set on OHMS scale. The positive (+) socket may be either the upper or lower socket.

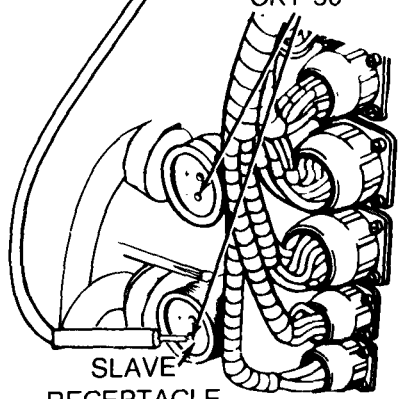


FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



TO VEHICLE GROUND

SLAVE RECEPTACLE CKT 50



SLAVE RECEPTACLE

1 **Check battery slave cable (CKT 50-GROUND) for continuity from negative socket (—) of slave receptacle to ground.**

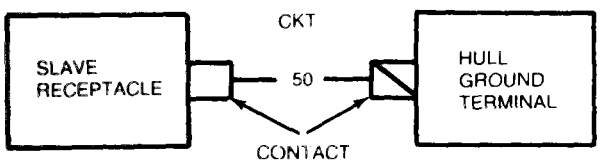
Technician (Commander's Station)

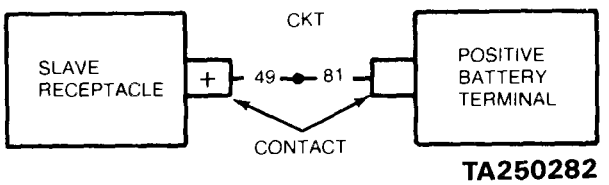
- Displace protective cap from defective slave receptacle.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to negative socket (—) of slave receptacle (CKT 50) and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?

NO → **2** **Repair battery slave cable (CKT 50) (page 10-298).**

YES → **3** **Repair battery slave cable (CKT 49) (page 10-298).**





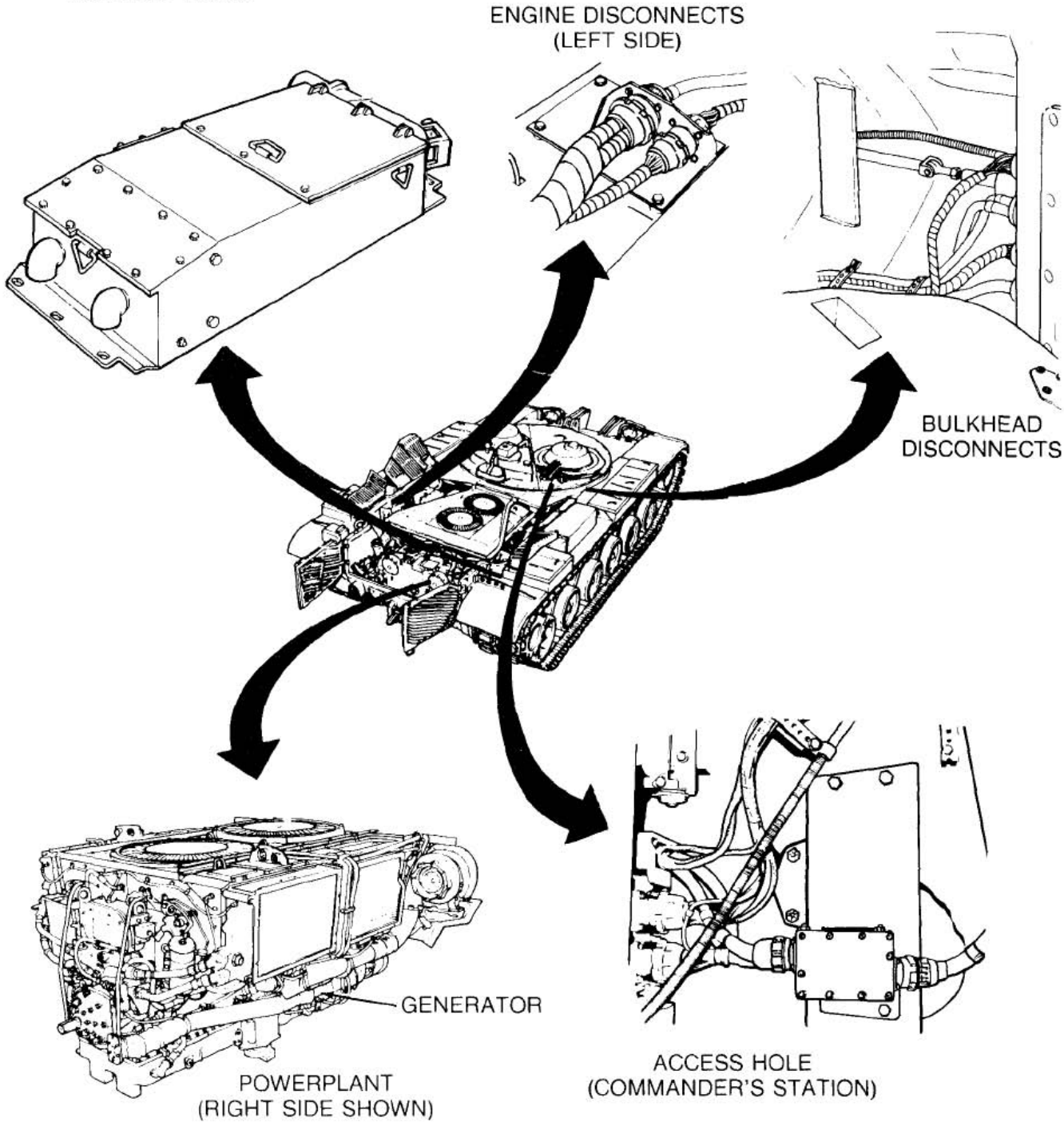
TA250282

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER

Symptom-31

300 AMP GENERATOR/REGULATOR SYSTEM IS NOT WORKING

LOCATOR VIEWS:



TA250283

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

Symptom-31

300 AMP GENERATOR/REGULATOR SYSTEM IS NOT WORKING

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

(1) Check if air cleaner blower motors work.

Second Technician (Operator's Station)

- Start engine.

First Technician (Outside Vehicle)

- Check to see if air exhaust can be felt at any of the four blower motor exhaust elbows.

Second Technician (Operator's Station)

- Stop Engine.
- Set MASTER BATTERY switch OFF.

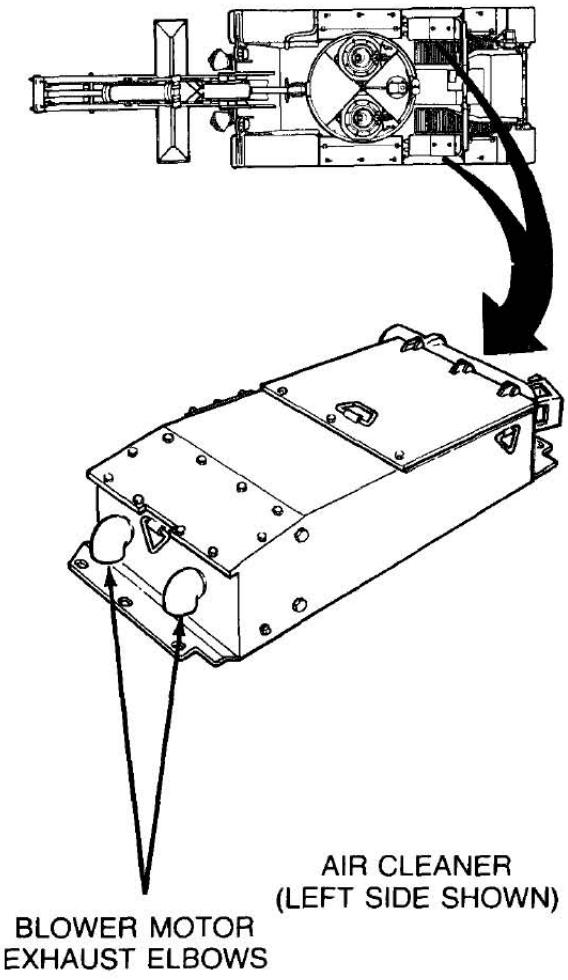
Are any air cleaner blower motors working?

(2)

- **Check CKT 1 from connector at voltage regulator to connector at engine disconnect for continuity.**
- **See Step (8).**

NO

YES



TA250284

Symptom-31

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

3 **Check voltage regulator lead from regulator to vehicle ground for continuity.**

First Technician (Commander's Station)

- Remove right-hand floor access cover (page 7-9).
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91) (page 4-83).
- Connect red probe of meter to voltage regulator lead connected to voltage regulator and black probe to ground.
- Check if meter indicates continuity.

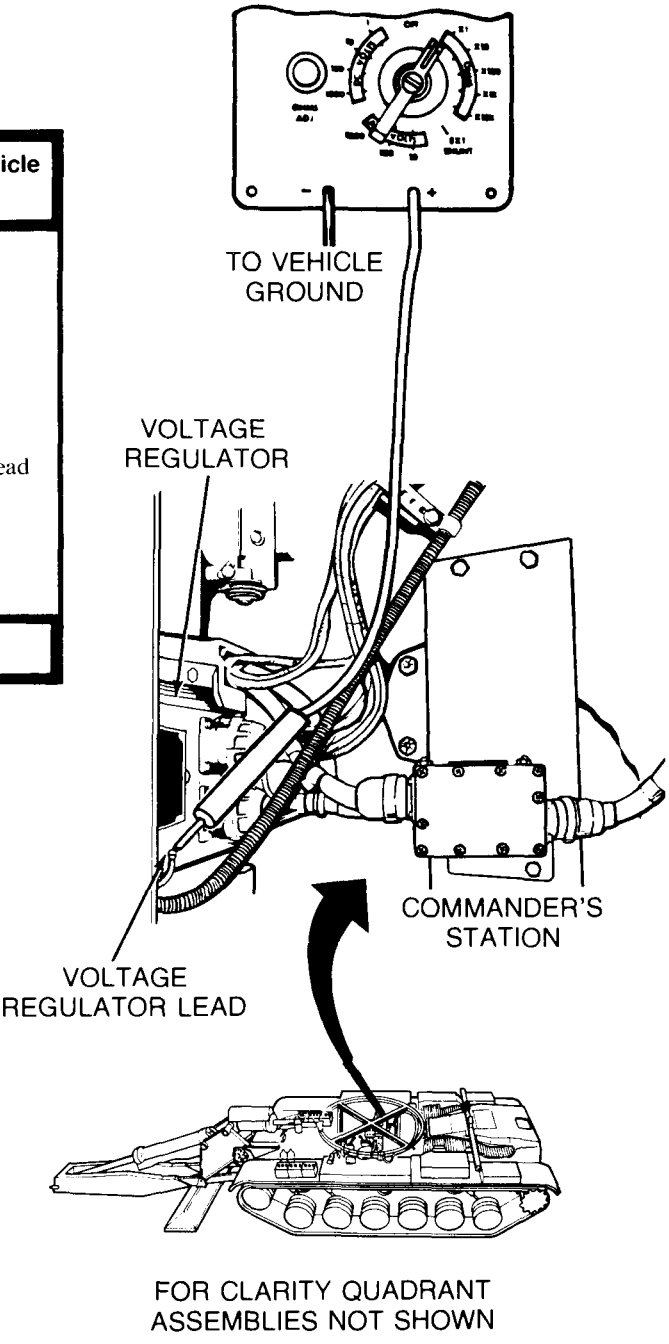
Does meter indicate continuity?

4

- **Clean and tighten loose voltage regulator lead connections.**
- **If connections are not loose, replace damaged voltage regulator lead (page 10-18).**

NO

YES



TA250285

Symptom-31

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

5 **Check hull power harness (CKT 5) at voltage regulator for electrical power.**

First Technician (Commander's Station)

- Disconnect hull power harness connector (CKT 5) from voltage regulator.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact A of hull power harness connector and black probe to ground.

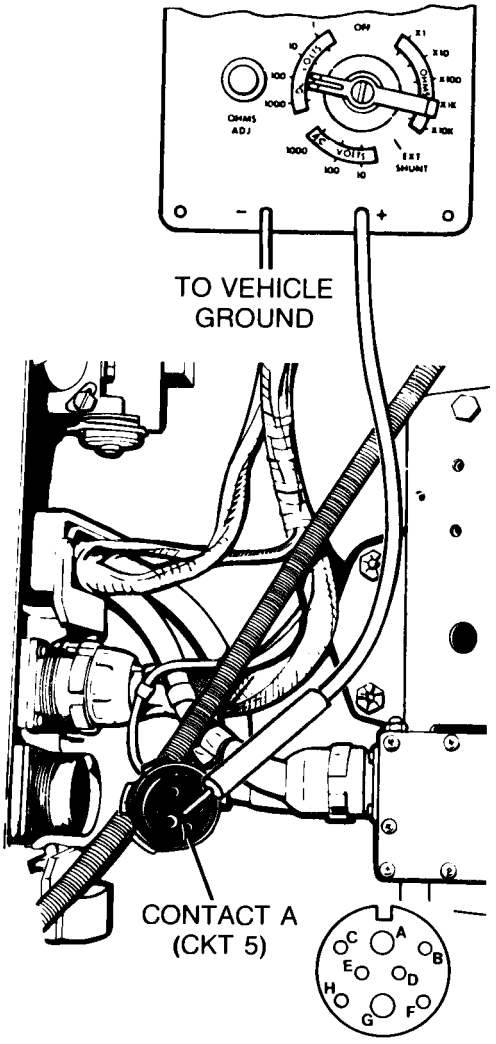
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



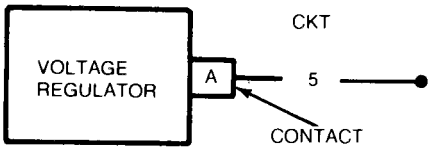
6

- **Inspect HULL POWER harness for bent/broken connector contact or loose CKT 5 wire at rear of connector.**
- **Repair connector if defective (page 10-298).**
- **If connector is not defective, notify support maintenance of a defective hull power harness.**
- **Connect hull power harness connector to voltage regulator.**
- **Install floor access cover (page 17-7).**

NO

YES

7 **Replace voltage regulator (page 10-18).**



TA250286

Symptom-31

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

FROM STEP (2)

(8) Check CKT 1 from connector at voltage regulator to connector at engine disconnect for continuity.

Second Technician (Left Top Deck Grille Doors)

- Open left top deck grille doors to gain access to engine disconnects.
- Disconnect bulkhead engine disconnect harness connector from engine disconnect.
- Connect jumper wire from contact C (CKT 1) of bulkhead engine disconnect harness connector to vehicle ground.

First Technician (Commander's Station)

- Remove right-hand floor access cover (page 17-7).
- Disconnect front accessory harness connector (CKTS 1, 2, 415A, 478) from voltage regulator.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact D (CKT 1) of front accessory harness connector and black probe to ground.
- Check if meter indicates continuity.

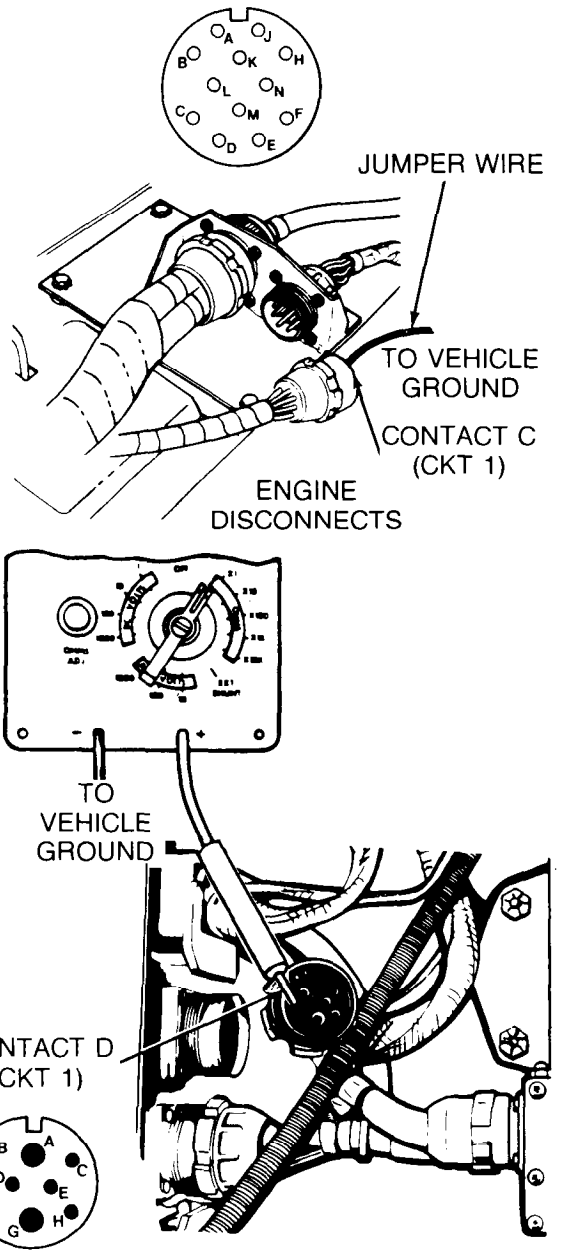
Does meter indicate continuity?

NO

(9) Check front accessory harness (CKT 1) from connector at voltage regulator to connector at bulkhead disconnect for continuity.

See Step (25).

YES



TA250287

Symptom-31

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

10 **Check CKT 478 from connector at voltage regulator to connector at engine disconnect for continuity.**

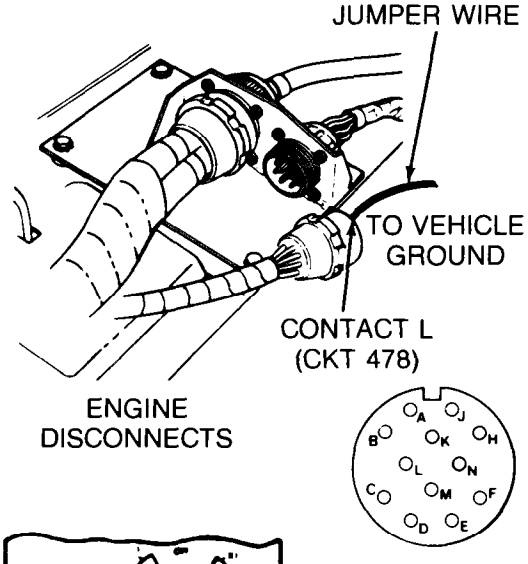
Second Technician (Left Top Deck Grille Doors)

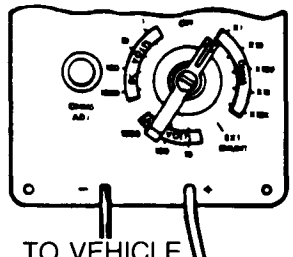
- Move jumper wire at bulkhead engine disconnect harness connector from contact C to contact L (CKT 478).

First Technician (Commander's Station)

- Connect red probe of meter to contact C (CKT 478) of front accessory harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?

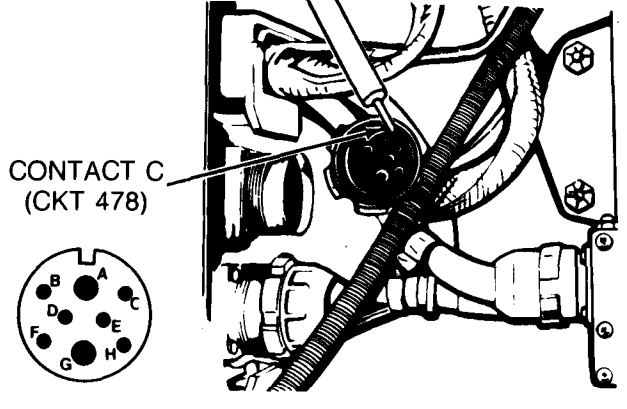




NO

11 **Check front accessory harness (CKT 478) from connector at voltage regulator to connector at bulkhead disconnect for continuity.**

See Step (28) .



YES

TA250288

Symptom-31

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

12 **Check CKT 2 from connector at voltage regulator to connector at engine disconnect for continuity.**

Second Technician (Left Top Deck Grille Doors)

- Connect bulkhead engine disconnect harness connector to engine disconnect.
- Disconnect power relay cable connector (CKT 2) from engine disconnect.
- Connect jumper wire from center contact (CKT 2) of power relay cable connector to vehicle ground.

First Technician (Commander's Station)

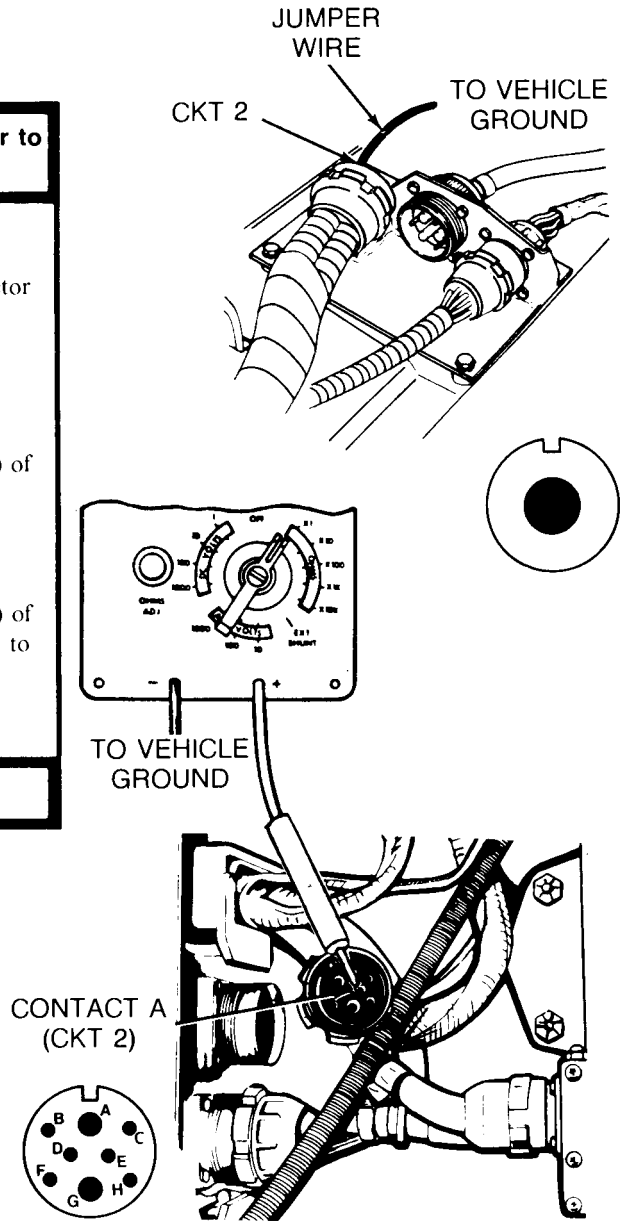
- Connect red probe of meter to contact A (CKT 2) of front accessory harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?

13 **Check front accessory harness (CKT 2) from connector at voltage regulator to connector at bulkhead disconnect for continuity.**

See Step (31) . — NO

YES



TA250289

Symptom-31

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

14 **Replace voltage regulator and check if BATT/GEN INDICATOR pointer is in green area.**

First Technician (Commander's Station)

- Replace voltage regulator (page 10-18).

Second Technician (Left Top Deck Grille Doors)

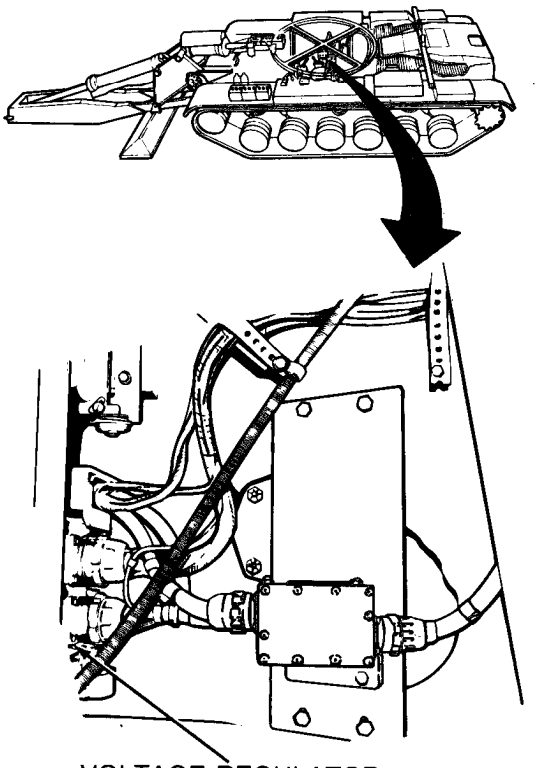
- Connect power relay cable connector to engine disconnect.

Second Technician (Operator's Station)

- Start engine.
- Check if BATT GEN INDICATOR pointer is in green area.
- Stop engine.
- Set MASTER BATTERY switch OFF.

Was BAT GEN INDICATOR pointer in green area?

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



NO

YES

15
- **Problem corrected.**
- **Close left top deck grille doors.**

TA250290

Symptom-31

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

16 **Check engine electrical harness (CKT 1) from connector at engine disconnect to terminal A on generator.**

First Technician (Commander's Station)

- Remove new voltage regulator just installed and reinstall old voltage regulator.

First Technician (Top Deck)

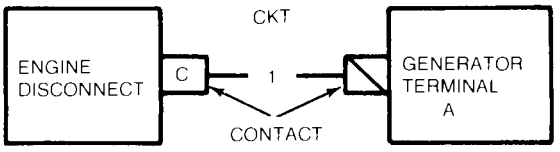
- Have powerplant removed (page 5-2).

First Technician (Powerplant)

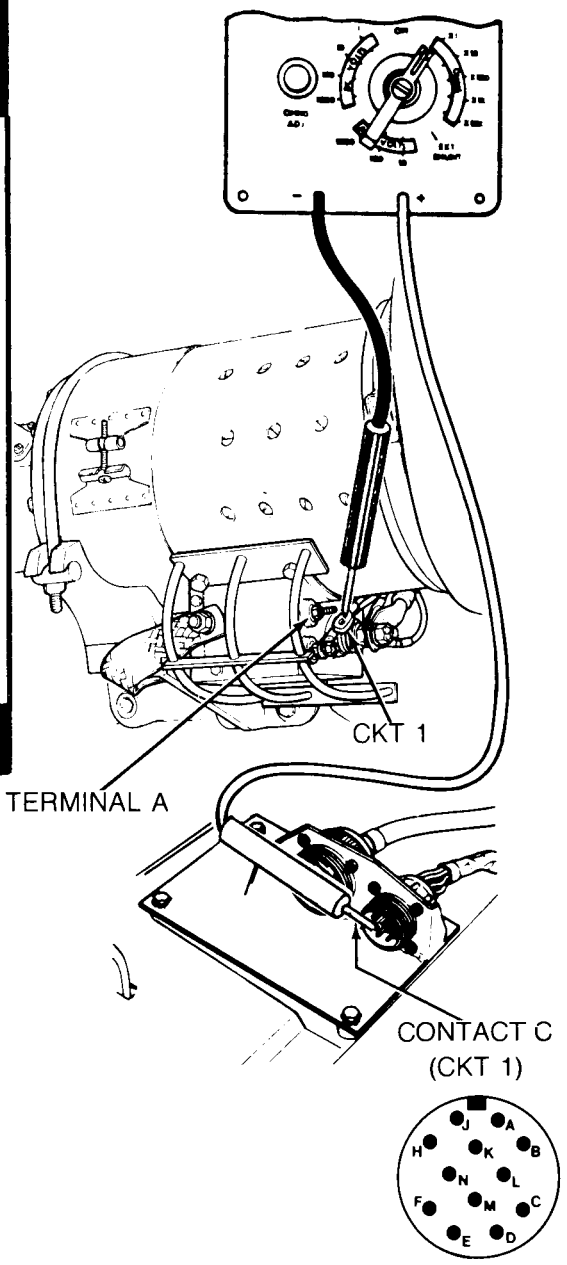
- Connect red probe of meter to contact C (CKT 1) of engine electrical harness connector at engine disconnect.
- Disconnect engine electrical harness terminal connector (CKT 1) from terminal A of generator.
- Connect black probe of meter to terminal connector (CKT 1) of engine electrical harness.
- Check if meter indicates continuity.

Does meter indicate continuity?

17 **Repair engine electrical harness (page 10-298).**



YES



TA250291

Symptom-31

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

18 **Check engine electrical harness (CKT 478) from connector at engine disconnect to terminal D on generator.**

First Technician (Powerplant)

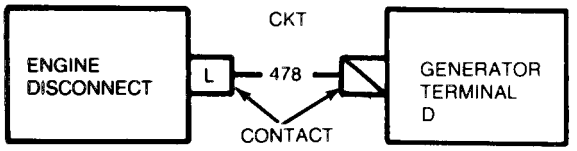
- Connect red probe of meter to contact L (CKT 478) of engine electrical harness connector at engine disconnect.
- Connect black probe of meter to terminal D (CKT 478) on generator.
- Check if meter indicates continuity.

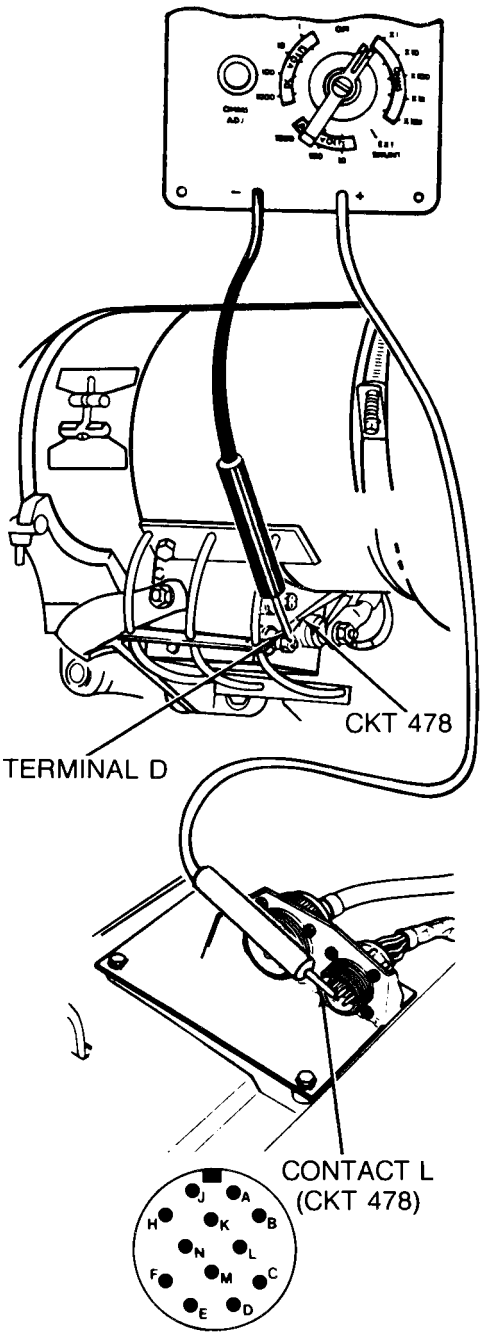
Does meter indicate continuity?

19 **Repair engine electrical harness (page 10-298).**

NO

YES





TA250292

Symptom-31

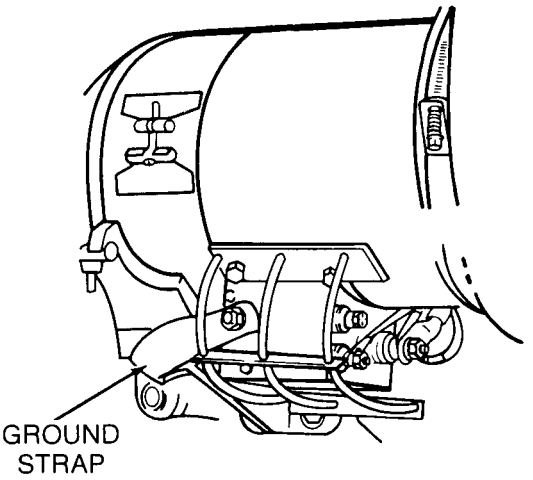
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

20 **Check for loose ground strap connections or damaged ground strap on generator.**

First Technician (Powerplant)

- Connect CKT 1 terminal lug to terminal A of generator.
- Check if ground strap connections are loose.
- Check ground strap for damage.

Is ground strap loose or damaged?



NO

YES

21

- **Clean and tighten loose ground strap.**
- **If ground strap is damaged, replace damaged ground strap (page 10-6).**

TA250293

Symptom-31

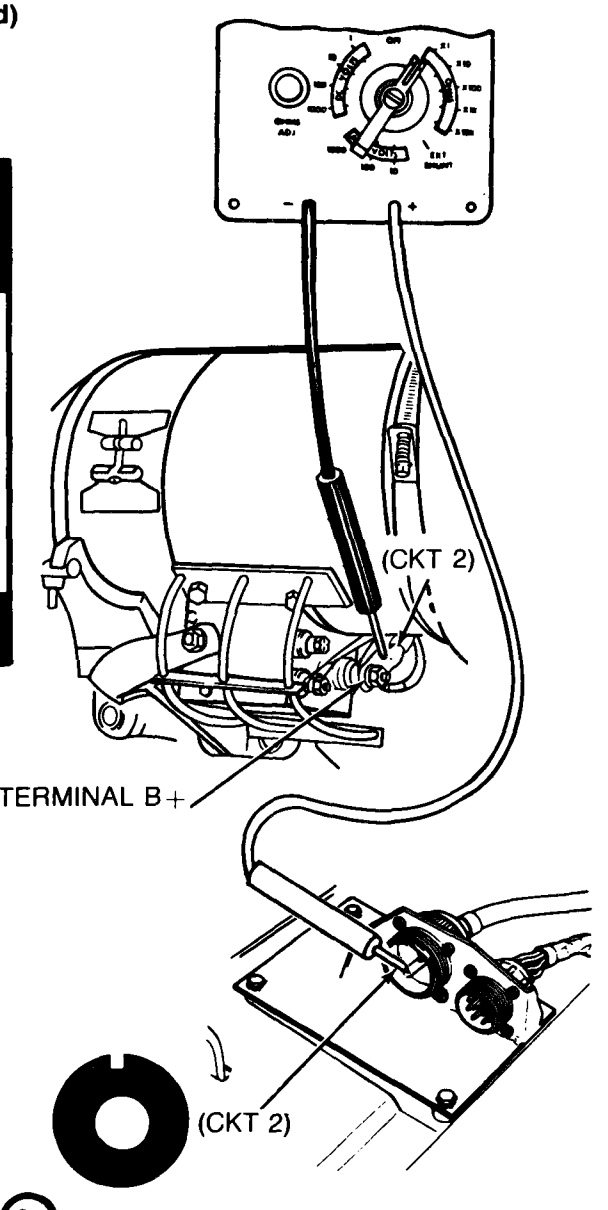
DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

22 **Check generator lead (CKT 2) from connector at engine disconnect to terminal B+** on generator for continuity.

First Technician (Powerplant)

- Connect red probe of meter to center contact (CKT 2) of generator lead assembly connector at engine disconnect.
- Connect black probe of meter to terminal B (CKT 2) on generator.
- Check if meter indicates continuity.

Does meter indicate continuity?

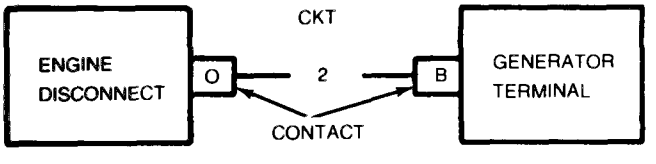


NO

23
- **Repair generator lead (page 10-298).**
- **Have powerplant installed (page 5-14).**

YES

24
- **Replace generator/blower assembly (page 10-6).**
- **Have powerplant installed (page 5-14).**



TA250294

Symptom-31

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

FROM STEP 9

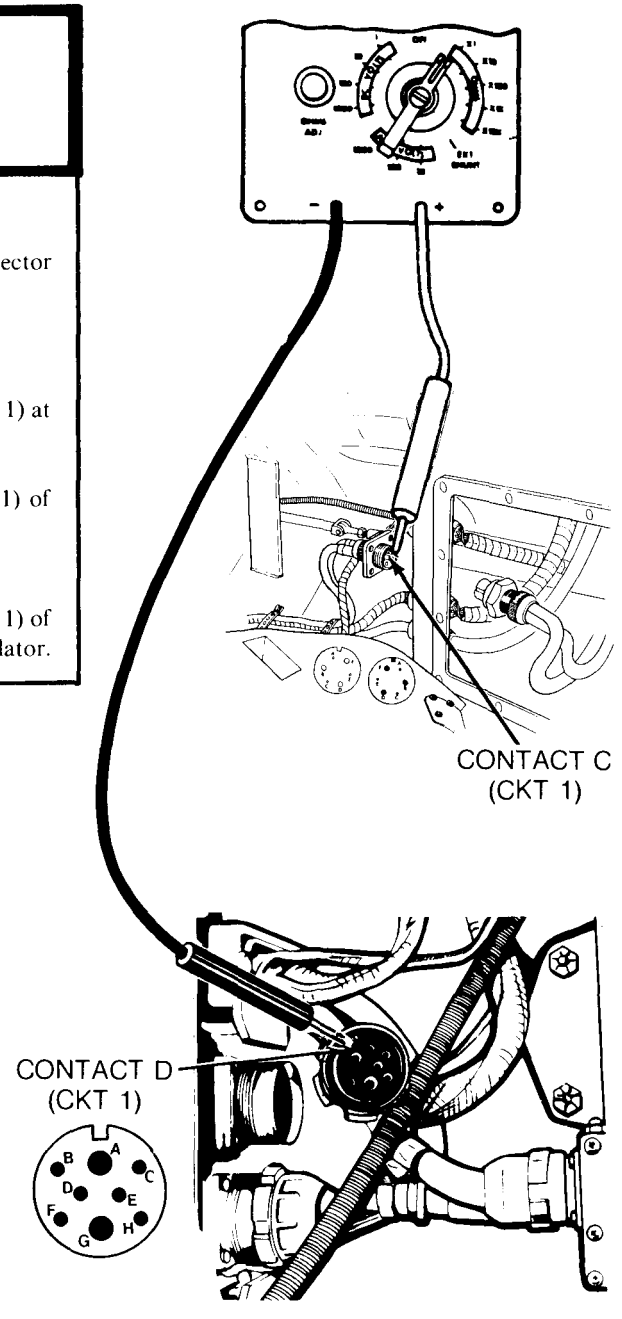
25 **Check front accessory harness (CKT 1) from connector at voltage regulator to connector at bulkhead disconnect for continuity.**

Second Technician (Left Top Deck Grille Doors)

- Connect bulkhead engine disconnect harness connector to engine disconnect.

First Technician (Commander's Station)

- Displace front accessory harness connector (CKT 1) at bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact C (CKT 1) of front accessory harness connector at bulkhead disconnect.
- Connect black probe of meter to contact D (CKT 1) of front accessory harness connector at voltage regulator.



TA250295

Symptom-31

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

STEP 25 CONTINUED

- Check if meter indicates continuity.

Does meter indicate continuity?

YES

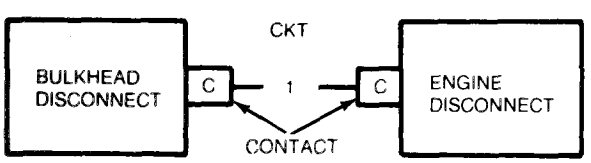
26

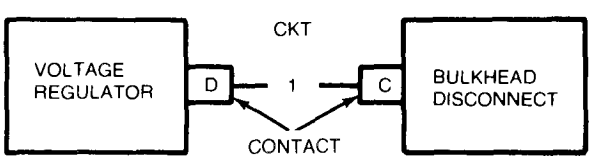
- **Inspect bulkhead engine disconnect harness for bent/broken connector contacts or loose CKT 1 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.**
- **Connect front accessory harness connector to voltage regulator.**
- **Install floor access cover (page 17-7).**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**

NO

27

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 1 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Connect front accessory harness connector to voltage regulator.**
- **Install floor access cover (page 17-7).**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**





TA250296

Symptom-31 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - HULL POWER
(Continued)

FROM STEP 11

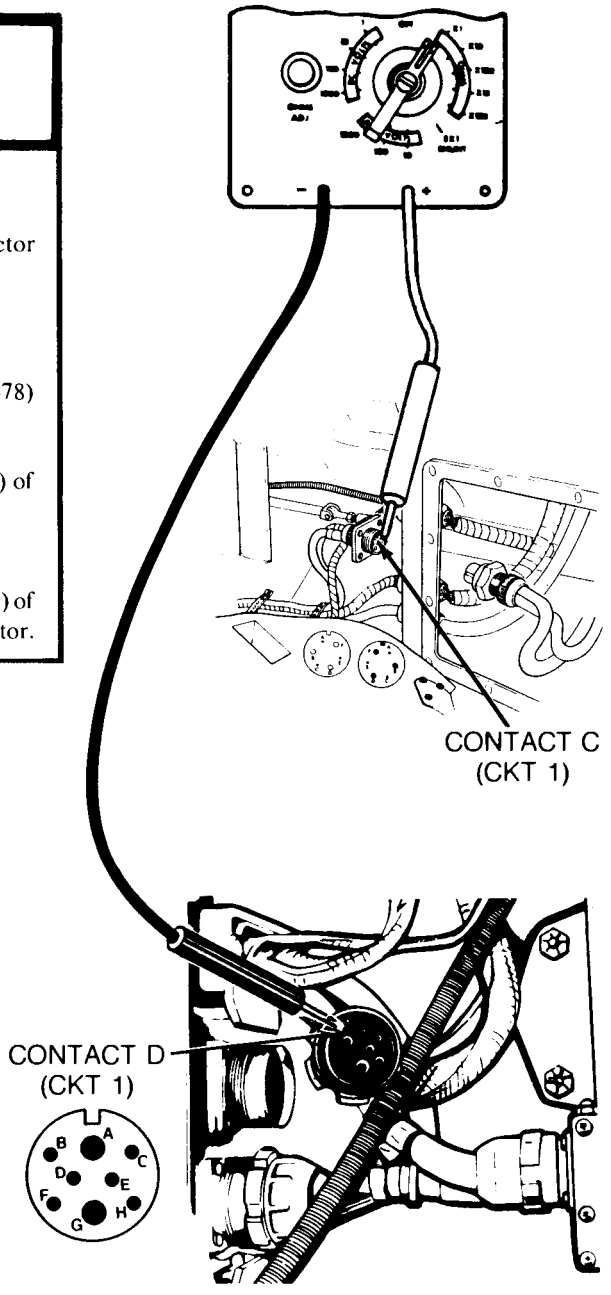
28 **Check front accessory harness (CKT 478) from connector at voltage regulator to connector at bulkhead disconnect for continuity.**

Second Technician (Left Top Deck Grille Doors)

- Connect bulkhead engine disconnect harness connector to engine disconnect.

First Technician (Commander's Station)

- Displace front accessory harness connector (CKT 478) at bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact L (CKT 478) of front accessory harness connector at bulkhead disconnect.
- Connect black probe of meter to contact C (CKT 478) of front accessory harness connector at voltage regulator.



TA250297

Symptom-31 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - HULL POWER
(Continued)

STEP (28) CONTINUED

- Check if meter indicates continuity.

Does meter indicate continuity?

YES

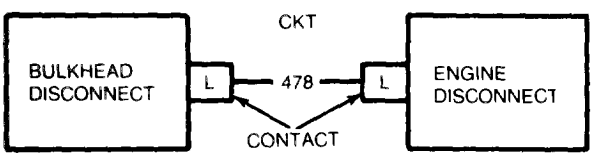
29

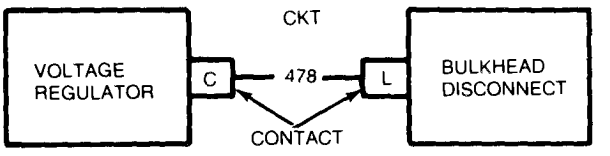
- **Inspect bulkhead engine disconnect harness for bent/broken connector contacts or loose CKT 478 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.**
- **Connect front accessory harness connector to voltage regulator.**
- **Install floor access cover (page 17-7).**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**

NO

30

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 478 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Connect front accessory harness connector to voltage regulator.**
- **Install floor access cover (page 17-7).**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**





TA250298

Symptom-31

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION - HULL POWER
(Continued)

FROM STEP 13

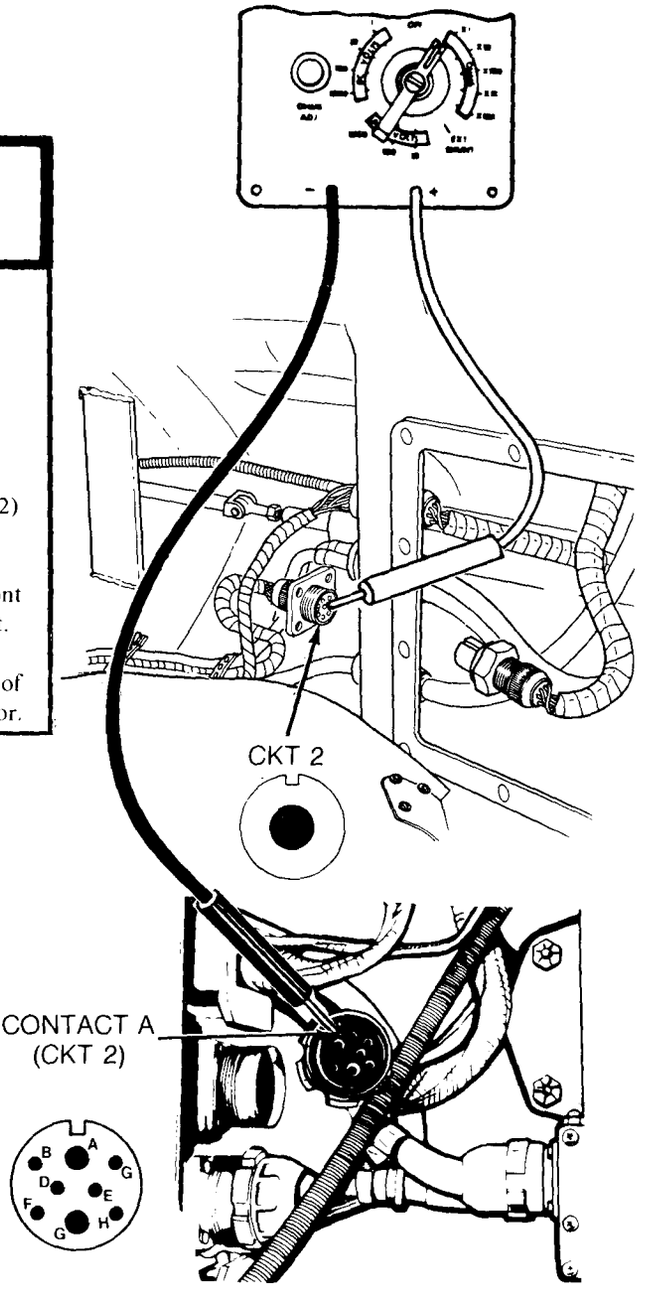
31 **Check front accessory harness (CKT 2) from connector at voltage regulator to connector at bulkhead disconnect for continuity.**

Second Technician (Left Top Deck Grille Doors)

- Reconnect power relay cable connector to engine disconnect.

First Technician (Commander's Station)

- Displace front accessory harness connector (CKT 2) at bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact (CKT 2) of front accessory harness connector at bulkhead disconnect.
- Connect black probe of meter to contact A (CKT 2) of front accessory harness connector at voltage regulator.



TA250299

Symptom-31 **DETAILED TROUBLESHOOTING PROCEDURE**
VEHICLE OPERATION - HULL POWER
(Continued)

STEP 31 CONTINUED

- Check if meter indicates continuity.

Does meter indicate continuity?

YES

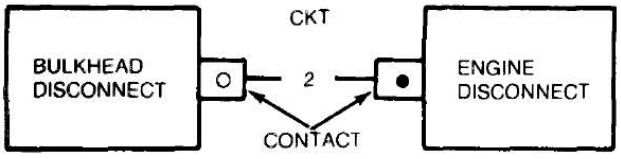
32

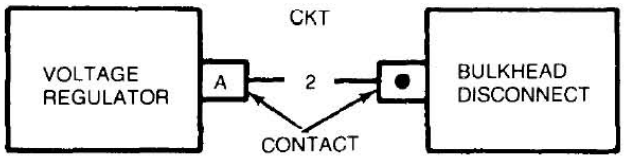
- **Inspect power relay cable for bent/broken connector contacts or loose CKT 2 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective power relay cable.**
- **Connect front accessory harness connector to voltage regulator.**
- **Install floor access cover (page 17-7).**
- **Install both front accessory harness connectors at bulkhead disconnect (page 10-270).**

NO

33

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 2 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Connect front accessory harness connector to voltage regulator.**
- **Install floor access cover (page 17-7).**
- **Install both front accessory harness connectors at bulkhead disconnect (page 10-270).**



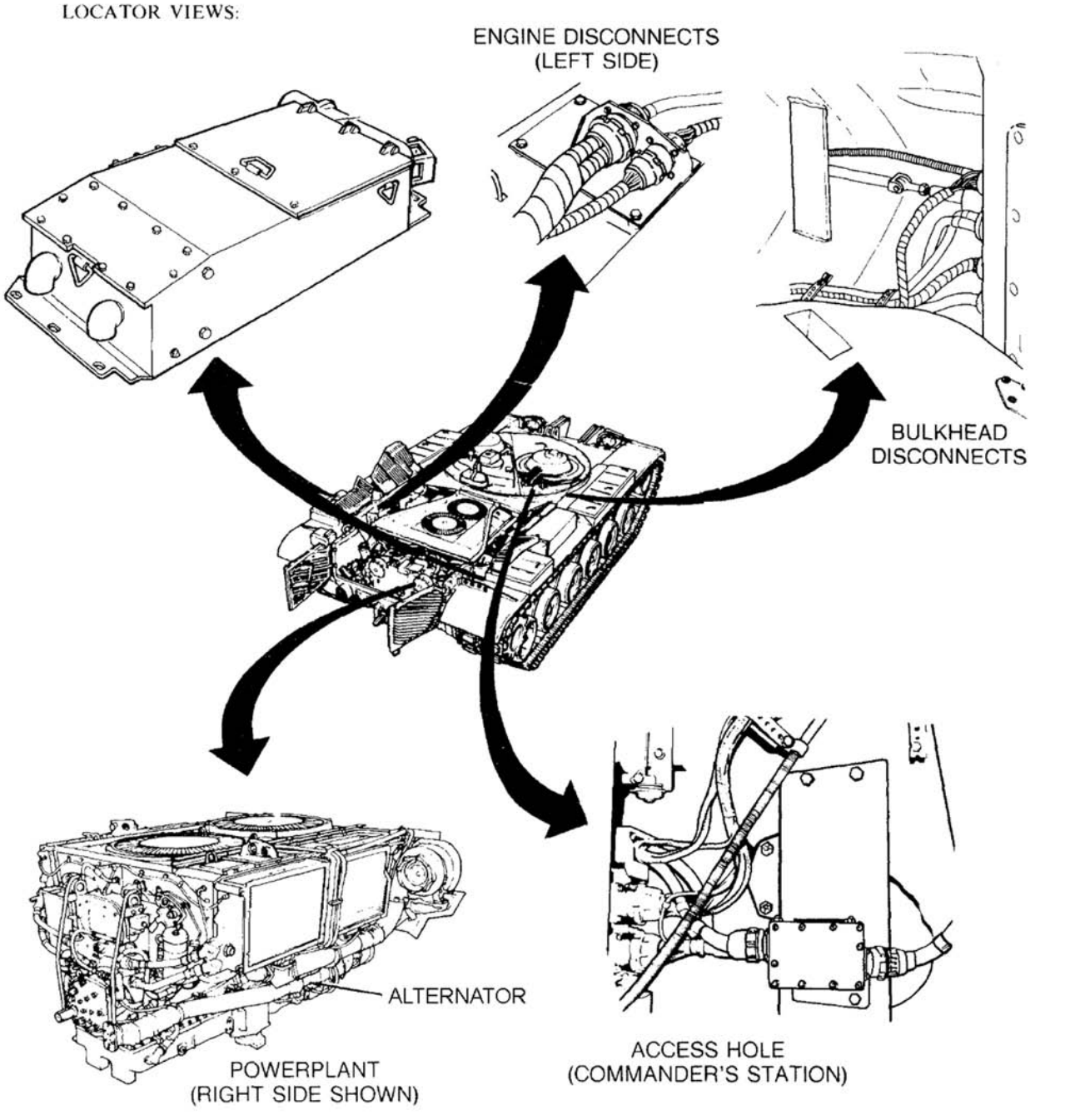


TA250300

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

650 AMP ALTERNATOR/REGULATOR IS NOT WORKING



TA250283

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

650 AMP ALTERNATOR/REGULATOR IS NOT WORKING - Continued

CAUTION

With engine running, do not disconnect generator harness at engine disconnect or bulkhead.

NOTE

This procedure is to be performed by two persons. The lead is referred to as the first technician and shall direct the activity of the second person called the second technician.

1

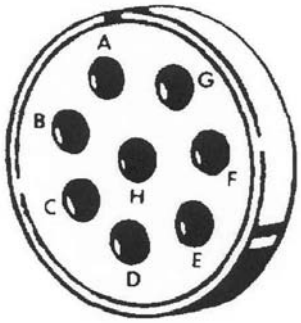
Second Technician (Operator's Station)

- Stop engine.
- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Remove commander's floor plate (page 17-9).
- Disconnect harness 12326542 connector (1, 1A, 532, 533, 534) from voltage regulator.
- Connect "T" harness (page 3-4, Item 38) to harness 12326542 connector (1, 1A, 532, 533, 534) removed from voltage regulator.

AT VOLTAGE REGULATOR



12326542
(1,1A, 532, 533, 534)

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

NOTE

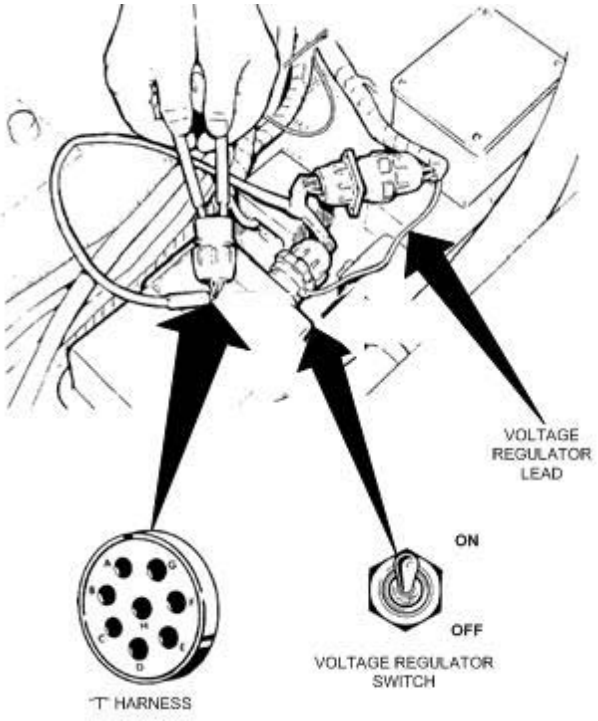
To ensure overvoltage protection circuit breaker on voltage regulator is in the ON (UP) position, turn the overvoltage circuit breaker to the OFF (DOWN) position, then to the ON (UP) position.

2 **Check continuity from socket C of the test harness to vehicle chassis (GROUND).**

First Technician (Commander's Station)

- Set multimeter to lowest range.
- Set circuit breaker on voltage regulator to ON.
- Connect "T" harness to voltage regulator.
- Connect red probe of meter to "T" harness socket C and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?



3

- Clean and tighten loose voltage regulator lead connections.
- If connections are not loose, replace harness 12326542 (page 10-1).

NO

YES

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

4 **Check CKT 1A at voltage regulator for electrical power.**

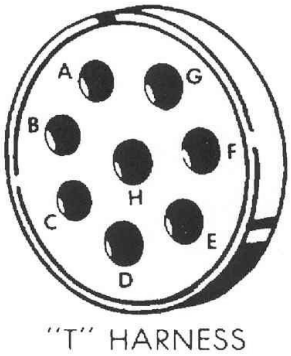
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL PUMP switch ON.

First Technician (Commander's Station)

- Connect red probe of meter to "T" harness socket A (+) and black probe to socket C (-).
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



"T" HARNESS

5 **Check CKT 1A from connector at voltage regulator to connector at master control panel.**

NO

- See step 59.

YES

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

6 **Check CKT 532 from voltage regulator to engine accessory relay for 100 to 200 ohms.**

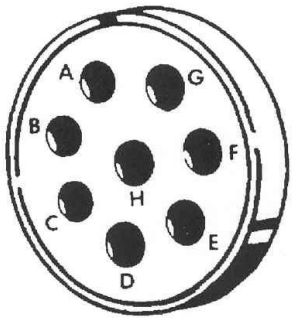
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set FUEL PUMPS switch OFF.

First Technician (Commander's Station)

- Disconnect "T" harness from voltage regulator.
- Connect red probe of meter to "T" harness socket F and black probe to socket C.
- Check if meter indicates 100 to 200 ohms.

Does meter show 100 to 200 ohms?



"T" HARNESS

NO

7 **Check CKT 532 from voltage regulator to engine accessory relay in harness 12326542 for continuity.**

- See step 54.

YES

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

8

Check for electrical power at pin B of bulkhead connector.

Second Technician (Operator's Station)

- Disconnect three battery ground cable assemblies (page 10-268).

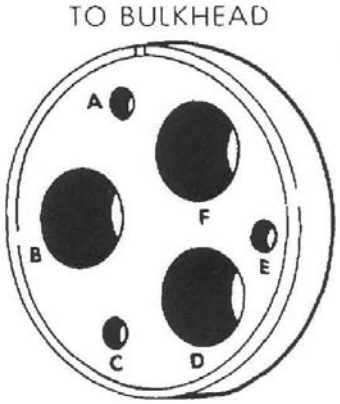
First Technician (Commander's Station)

- Displace front accessory harness 12326539 connector (CKT 2) at bulkhead disconnect (page 10-269).

Second Technician (Operator's Station)

- Connect three battery ground cables assemblies (page 10-268).
- Connect red probe of meter to socket B on bulkhead disconnect harness 12326699 and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



12326699

9

- Repair/replace harness 12326539 (page 10-1).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534)**.**
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

NO

YES

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

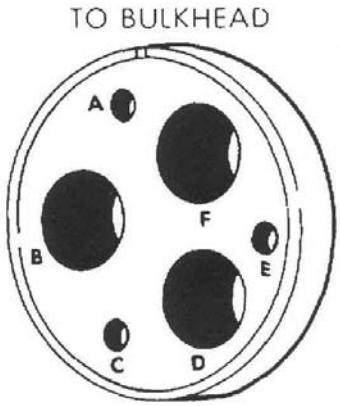
Symptom-31.1

10 **Check for electrical power at pin F of bulkhead connector.**

First Technician (Commander's Station)

- Connect red probe of meter to socket F on bulkhead disconnect harness 12326699 and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



12326699

NO

11
- Repair/replace harness 12326539 (page 10-1).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

YES

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

12 **Check CKT 2 for continuity to alternator in harnesses 12326539 and 12468996.**

First Technician (Commander's Station)

- Connect red probe of meter to socket B on bulkhead disconnect harness 12326539 and black probe to socket F.
- Check if meter indicates continuity.

Does meter indicate continuity?

12326539

13 **Check CKT 2 for continuity to alternator in harness 12468996.**

- See step 51.

NO

YES

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

CAUTION

Prior to performing a resistance check of the generator, discharge the radio interference suppressor. Use an insulated piece of wire, place one end on pin F and ground the other end of the wire to the vehicle chassis. This procedure may have to be repeated several times to completely drain the suppressor. When no voltage is indicated between pin F and ground, then it is safe to perform the resistance check.

12326539

14 **Check for shorted diodes in alternator.**

First Technician (Commander's Station)

- Connect red probe of meter to pin B on bulkhead disconnect harness 12326539 and black probe to ground.
- Check if meter indicates infinite resistance.

Does meter indicate infinite resistance?

15

- Replace alternator (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

NO

YES

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

16 **Check CKT 2 for open diode in alternator.**

First Technician (Commander's Station)

- Set multimeter to diode scale.
- Connect black probe of meter to pin B on bulkhead disconnect harness 12326539 and red probe to ground.
- Check if meter indicates 0.3 to 0.8 volts dc.

Does meter indicate 0.3 to 0.8 volts dc?

NO

17

- Replace alternator (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534)**.**
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

YES

12326539

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

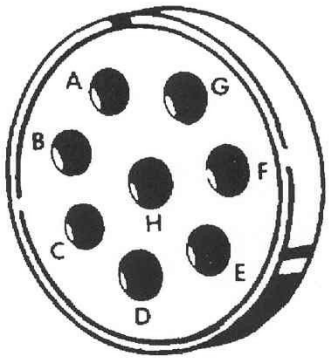
Symptom-31.1

18 **Check CKT 1 from voltage regulator to alternator for 100 to 200 ohms.**

First Technician (Commander's Station)

- Set multimeter to resistance scale.
- Connect red probe of meter to "T" harness socket E and black probe of to ground.
- Check if meter shows 100 to 200 ohms.

Does meter show 100 to 200 ohms?



"T" HARNESS

19 **Check CKT 1 for continuity in harnesses 12326542, 12326538 and 12468994.**

NO

- See step 43.

YES

20 **Check CKT 534 from voltage regulator to alternator for 100 to 200 ohms.**

First Technician (Commander's Station)

- Connect red probe of meter to "T" harness socket B and black probe to ground.
- Check if meter shows 100 to 200 ohms.

Does meter show 100 to 200 ohms?

21 **Check CKT 534 for continuity in harnesses 12326542, 12326538 and 12468994.**

NO

- See step 35.

YES

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

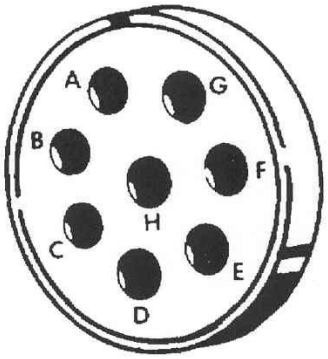
Symptom-31.1

22 **Check CKT 533 for open diode in alternator.**

First Technician (Commander's Station)

- Set multimeter to diode scale.
- Connect black probe of meter to "T" harness socket D and red probe to ground.
- Check if meter indicates 0.2 to 0.5 volts dc.

Does meter indicates 0.2 to 0.5 volts dc?



"T" HARNESS

23 **Check CKT 533 for continuity in harnesses 12326542, 12326538 and 12468994.**

- See step 35.

NO

YES

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

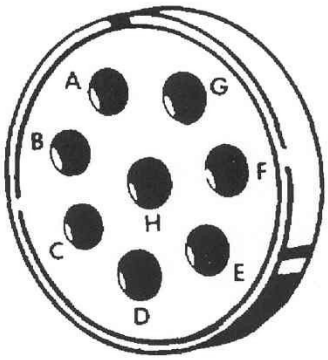
24

Check for shorted diodes in alternator.

First Technician (Commander's Station)

- Set multimeter to resistance scale.
- Connect black probe of meter to "T" harness socket D and red probe to ground.
- Check if meter indicates infinite resistance.

Does meter indicate infinite resistance?



"T" HARNESS

NO

25

- Replace alternator (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269)
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9)

YES

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

26

Check CKT 1 at voltage regulator for 18 to 26 volts dc.

Second Technician (Operator's Station)

- Disconnect three battery ground cable assemblies (page 10-268).

First Technician (Commander's Station)

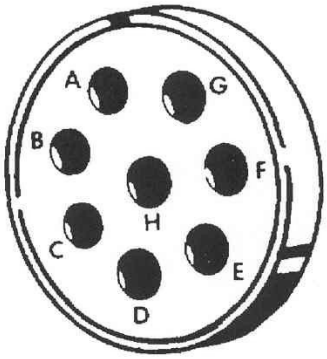
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).

Second Technician (Operator's Station)

- Connect three battery ground cables assemblies (page 10-268).

First Technician (Commander's Station)

- Connect "T" harness to voltage regulator.
- Set MASTER BATTERY switch ON.
- Set FUEL PUMPS switch ON.
- Connect red probe of meter to "T" harness socket E and black probe to socket C.
- Check if meter indicates 18 to 26 volt dc.



"T" HARNESS

Does meter indicate 18 to 26 volt dc?

NO

27

- Set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Disconnect "T" harness from voltage regulator.
- Replace voltage regulator (page 10-1).

YES

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

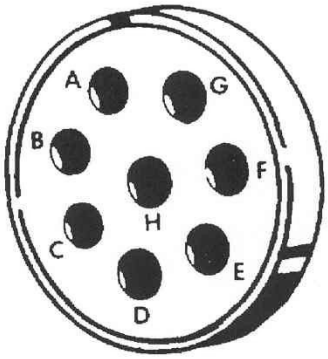
Symptom-31.1

28

Check CKT 1A at voltage regulator for 25 to 30 volts dc.

Second Technician (Operator's Station)

- Start Engine.
- Set Idle speed to 750 RPM.
- Turn OFF all lights, ventilator blowers and radio equipment.
- Connect red probe of meter to "T" harness socket A and black probe socket C.
- Check if meter indicates 25 to 30 volt dc.



"T" HARNESS

Does meter indicate 25 to 30 volts dc?

NO

29

- Stop Engine.
- Set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Disconnect "T" harness from voltage regulator.
- Replace voltage regulator (page 10-1).

YES

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

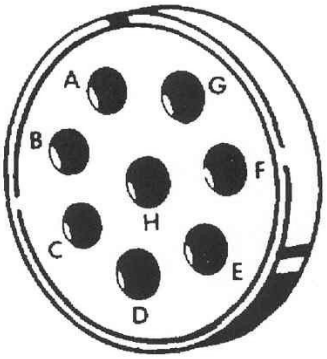
30

Check CKT 1 at voltage regulator for 1 to 5 volts dc.

First Technician (Commander's Station)

- Connect red probe of meter to "T" harness socket E and black probe to socket C.
- Check if meter indicates 1 to 5 volt dc.

Does meter indicate 1 to 5 volt dc?



"T" HARNESS

31

- Stop Engine.
- Set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Disconnect "T" harness from voltage regulator.
- Replace voltage regulator (page 10-1).

NO

YES

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

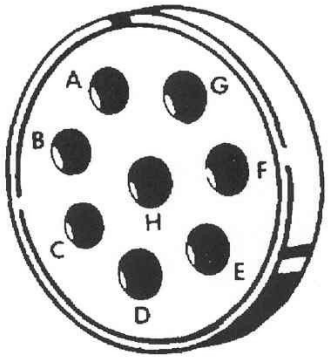
Symptom-31.1

32 **Check CKT 532 at voltage regulator for 24 to 29 volts dc.**

First Technician (Commander's Station)

- Connect red probe of meter to "T" harness socket F and black probe to socket C.
- Check if meter indicates 24 to 29 volt dc.

Does meter indicate 24 to 29 volts dc?



"T" HARNESS

NO

33

- Stop Engine.
- Set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Disconnect "T" harness from voltage regulator.
- Replace voltage regulator (page 10-1).

YES

34

- Stop Engine.
- Set FUEL PUMPS switch OFF.
- Set MASTER BATTERY switch OFF.
- Replace alternator (page 10-1).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

FROM STEPS 21 & 23

35 **Check CKTs 533 and 534 for continuity in harnesses 12326542 and 12326538.**

Second Technician (Left Top Deck Grille Doors)

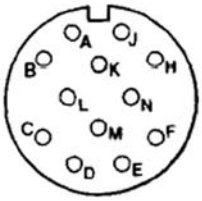
- Open left top deck grille doors to gain access to engine disconnects.
- Disconnect bulkhead engine disconnect harness 12326538 connector from engine disconnect harness 12468994.
- Connect jumper wire from contact C (CKT 533) of bulkhead engine disconnect harness 12326538 connector to contact L (CKT 534).

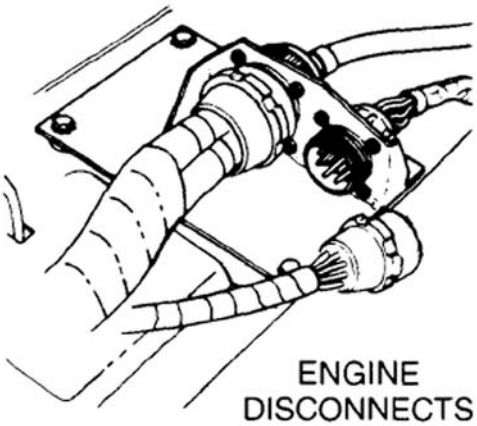
First Technician (Commander's Station)

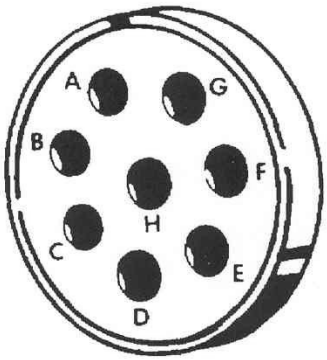
- Connect red probe of meter to "T" harness socket B and black probe to socket D.
- Check if meter indicates continuity.

Does meter indicate continuity?

12326538







"T" HARNESS

36 **Check CKTs 533 and 534 for continuity in harness 12326542.**

- See step 40.

NO

YES

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

37

Check engine electrical harness (CKTs 533 and 534) from connector at engine disconnect to J1 on alternator.

First Technician (Top Deck)

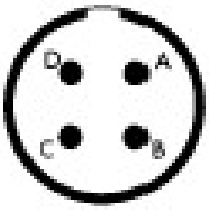
- Have powerplant removed (page 5-2).

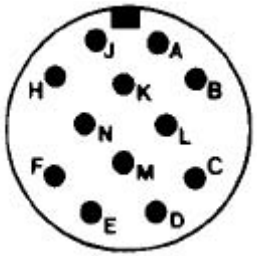
First Technician (Powerplant)

- Disconnect harness 12468994 from J1 of alternator.
- Connect jumper wire from contact A (CKT 533) of harness 12468994 to contact B (CKT 534).
- Connect red probe of meter to socket C of engine disconnect harness 12468994 connector and black probe to socket L.
- Check if meter indicates continuity.

Does meter indicate continuity?

12468994





12468994

NO

38

- Replace engine electrical harness 12468994 (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).
- Disconnect “T” harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander’s floor plate (page 17-9).

YES

39

- Replace alternator (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).
- Disconnect “T” harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander’s floor plate (page 17-9).

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

FROM STEP 36

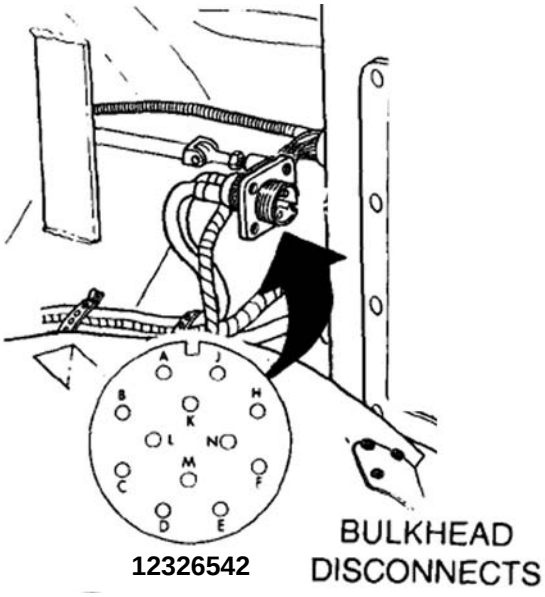
40

Check CKTs 533 and 534 for continuity in harness 12326542.

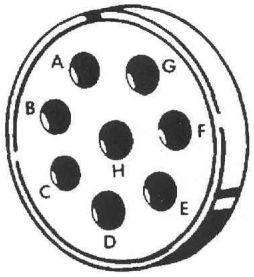
First Technician (Commander's Station)

- Displace front accessory harness 12326538 connector at bulkhead disconnect (page 10-269).
- Connect jumper wire from contact C (CKT 534) of harness 12326542 to contact L (CKT 533).
- Connect red probe of meter to "T" harness socket B and black probe to socket D.
- Check if meter indicates continuity.

Does meter indicate continuity?



12326542 BULKHEAD DISCONNECTS



"T" HARNESS

NO

41

- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534)**.**
- Replace harness 12326542 (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).

YES

42

- Replace harness 12326538 (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534)**.**
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9)

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

FROM STEP 19

43

Check CKT 1 for continuity in harnesses 12326542 and 12326538.

Second Technician (Left Top Deck Grille Doors)

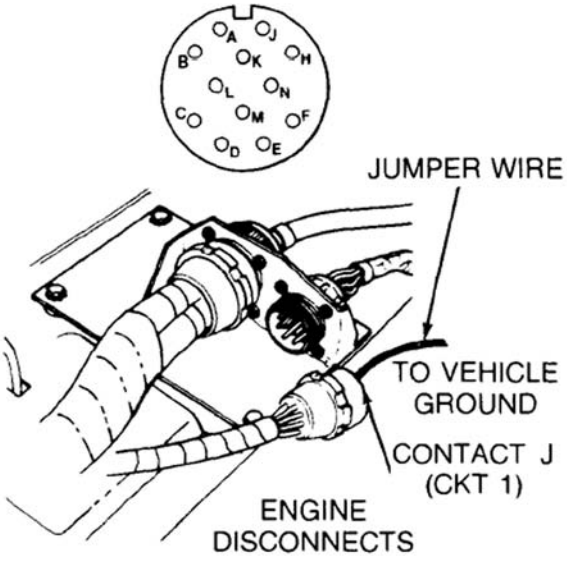
- Open left top deck grille doors to gain access to engine disconnects.
- Disconnect bulkhead engine disconnect harness 12326538 connector from engine disconnect.
- Connect jumper wire from contact J (CKT 1) of bulkhead engine disconnect harness 12326538 connector to ground.

First Technician (Commander's Station)

- Connect red probe of meter to "T" harness socket E and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?

12326538



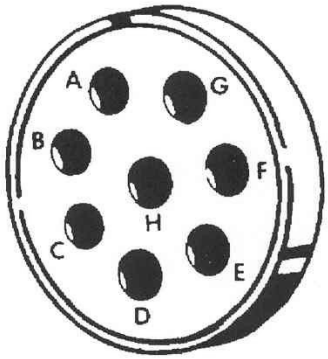
44

Check CKT 1 for continuity in harness 12326542.

- See step 48.

NO

YES



"T" HARNESS

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

45

Check engine electrical harness (CKT 1) from connector at engine disconnect to J2 on alternator.

First Technician (Top Deck)

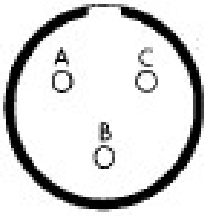
- Have powerplant removed (page 5-2).

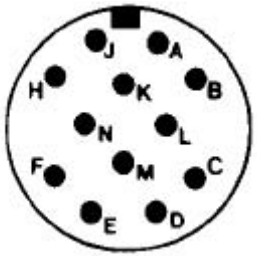
First Technician (Powerplant)

- Disconnect harness 12468994 from J2 of alternator.
- Connect jumper wire from contact C (CKT 1) of harness 12468994 to ground.
- Connect red probe of meter to socket J of engine disconnect harness 12468994 and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?

12468994





12468994

NO

46

- Replace engine electrical harness 12468994 (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).
- Disconnect “T” harness from harness 12326542 connector (1, 1A, 532, 533, 534)**.**
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander’s floor plate (page 17-9).

YES

47

- Replace alternator (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).
- Disconnect “T” harness from harness 12326542 connector (1, 1A, 532, 533, 534)**.**
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander’s floor plate (page 17-9).

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

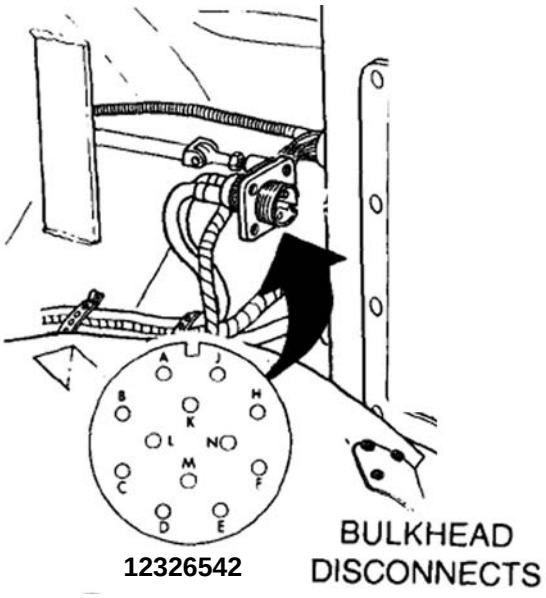
FROM STEP 44

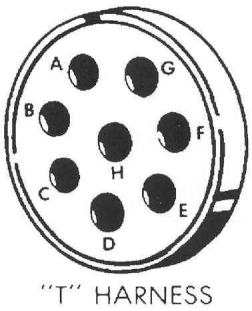
48 **Check CKT 1 for continuity in harness 12326542.**

First Technician (Commander's Station)

- Displace front accessory harness connector (12326538) at bulkhead disconnect (page 10-269).
- Connect jumper wire from contact J (CKT 1) of harness 12326542 to ground.
- Connect red probe of meter to "T" harness socket E and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?





NO

49

- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Replace harness 12326542 (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).
- Connect bulkhead engine disconnect harness 12326538 connector to engine disconnect.
- Close left top deck grille doors.

YES

50

- Replace harness 12326538 (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

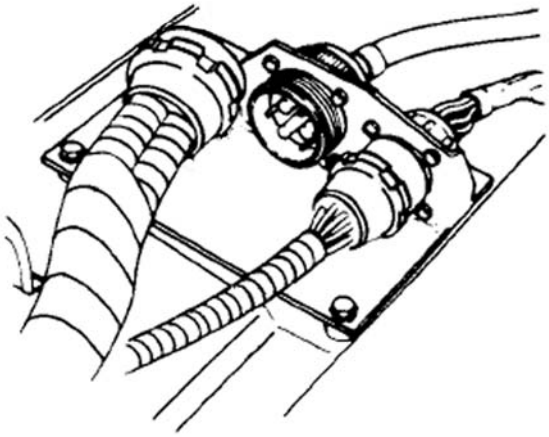
FROM STEP 13

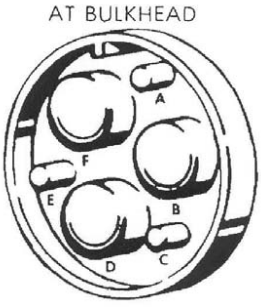
51 **Check CKT 2 for continuity to alternator in harness 12468996.**

First Technician (Commander's Station)

- Open left top deck grille doors to gain access to engine disconnects.
- Disconnect bulkhead engine disconnect harness 12326539 connector from engine disconnect.
- Connect red probe of meter to socket B on engine disconnect and black probe to socket F.
- Check if meter indicates continuity.

Does meter indicate continuity?





12326539

NO

52

- Replace harness 12468996 (page 10-1).
- Connect front accessory harness 12326539 connector (CKT 2) to bulkhead disconnect (page 10-269).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534)**.**
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

YES

53

- Replace harness 12326539 (page 10-1).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534)**.**
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

FROM STEP 7

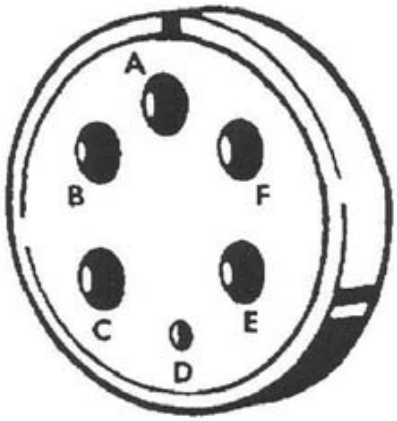
54

Check CKT 532 from voltage regulator to engine accessory relay in harness 12326542 for continuity.

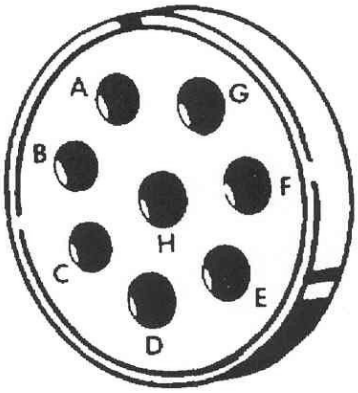
First Technician (Commander's Station)

- Disconnect harness 12326542 from engine accessory relay.
- Connect red probe of meter to pin F of harness 12326542 that was removed from accessory relay.
- Connect black probe of meter to "T" harness socket F.
- Check if meter indicates continuity.

Does meter indicate continuity?



12326542



"T" HARNESS

55

- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Replace harness 12326542 (page 10-1).

NO

YES

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

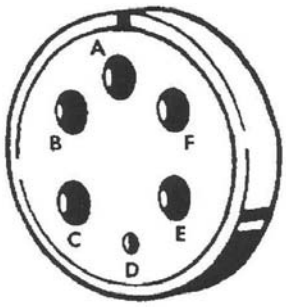
56

Check ground wire from voltage regulator in harness 12326542 for continuity.

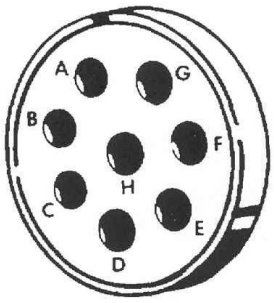
First Technician (Commander's Station)

- Connect red probe of meter to pin D of harness 12326542 that was removed from accessory relay.
- Connect black probe of meter to "T" harness socket C.
- Check if meter indicates continuity.

Does meter indicate continuity?



12326542



"T" HARNESS

NO

57

- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Replace harness 12326542 (page 10-1).

YES

58

- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace accessory relay (page 10-1).

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

FROM STEP 5

59 **Check CKT 1A from connector at voltage regulator to connector at master control panel.**

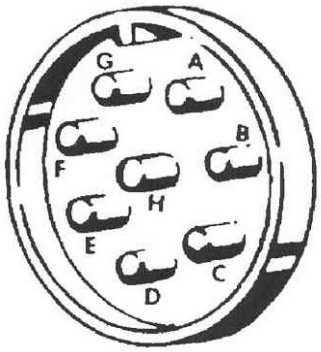
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect harness 12326536 (1A, 76, 54A, 459A, 486) from master control panel.
- Connect black probe of meter to 12326536 (1A, 76, 54A, 459A, 486) pin D.

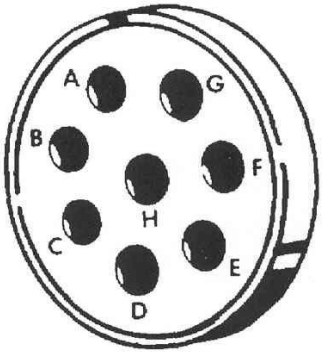
First Technician (Commander's Station)

- Connect red probe of meter to "T" harness socket A.
- Check if meter indicates continuity.

Does meter indicate continuity?



12326536 (1A, 76, 54A, 459A, 486)



"T" HARNESS

60 **Check CKT 1A from connector at disconnect panel to connector at master control**

- See step 66.

NO

YES

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

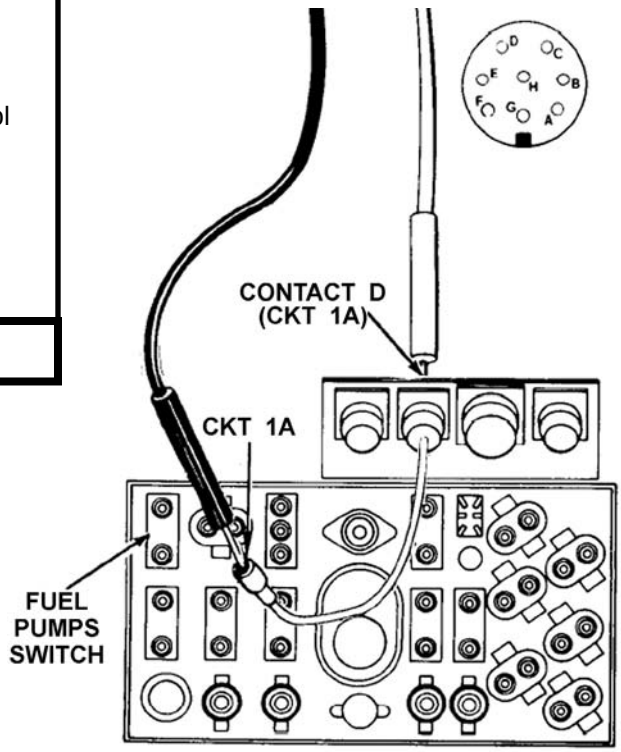
61

Check CKT 1A from master control panel pin D to fuel pump switch terminal.

Second Technician (Operator's Station)

- Displace master control panel (page 10-33).
- Connect red probe of meter to master control panel connector socket D.
- Connect black probe of meter to harness 12326547 terminal at the fuel pump switch.
- Check if meter indicates continuity.

Does meter indicate continuity?



NO

62

- Replace master control panel starting harness (page 10-97).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Disconnect "T" harness from voltage regulator.
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

YES

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

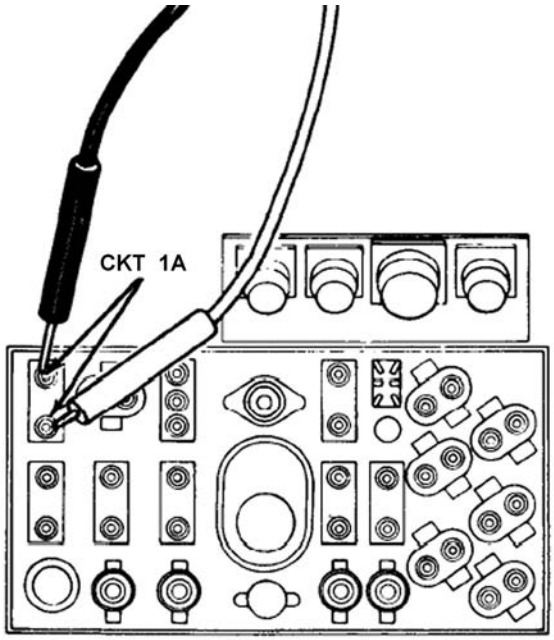
Symptom-31.1

63 **Check continuity of CKT 1A across fuel pump switch.**

Second Technician (Operator's Station)

- Set FUEL PUMPS switch to ON.
- Connect black probe of meter to harness 12326547 terminal at the fuel pump switch.
- Connect red probe of meter to wire 37 terminal at the fuel pump switch.
- Check if meter indicates continuity.

Does meter indicate continuity?



NO

64

- Replace FUEL PUMPS switch (page 10-47).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Disconnect "T" harness from voltage regulator.
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

YES

65

- Replace wire 1A (page 10-38)
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Disconnect "T" harness from voltage regulator.
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

DETAILED TROUBLESHOOTING PROCEDURE
VEHICLE OPERATION – HULL POWER
(Continued)

Symptom-31.1

FROM STEP 60

66

Check CKT 1A from connector at disconnect plate to connector at master control panel.

First Technician (Commander's Station)

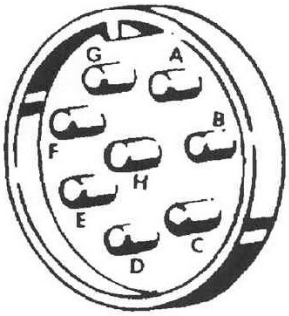
- Disconnect harness 12326536 (1A, 76, 54A, 459A, 486) from disconnect plate.
- Connect red probe of meter to 12326536 (1A, 76, 54A, 459A, 486) pin D.

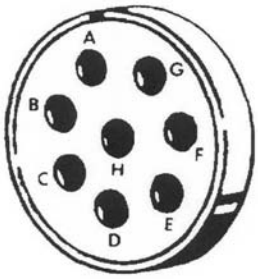
Second Technician (Operator's Station)

- Connect black probe of meter to 12326536 (1A, 76, 54A, 459A, 486) pin D.
- Check if meter indicates continuity.

Does meter indicate continuity?

12326536 (1A, 76, 54A, 459A, 486)





12326536 (1A, 76, 54A, 459A, 486)

NO

67

- Replace harness 12326536 (1A, 76, 54A, 459A, 486) (page 10-1).
- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Disconnect "T" harness from voltage regulator.
- Connect harness 12326542 connector (1, 1A, 532, 533, 534) to voltage regulator.
- Replace commander's floor plate (page 17-9).

YES

68

- Disconnect "T" harness from harness 12326542 connector (1, 1A, 532, 533, 534).
- Disconnect "T" harness from voltage regulator.
- Replace harness 12326542 (page 10-1).
- Connect harness 12326536 (1A, 76, 54A, 459A, 486) to disconnect plate.
- Connect harness 12326536 (1A, 76, 54A, 459A, 486) to master control panel.

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE

Symptom-32

ENGINE OIL PRESSURE GAGE WILL NOT SHOW PRESSURE (POWERPLANT WARNING LAMP NOT ON — ENGINE RUNNING — ALL OTHER GAGES READ NORMAL).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

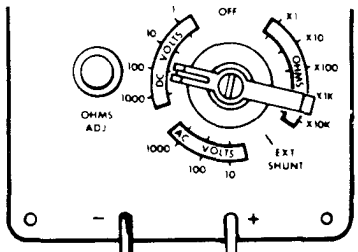
1 **Check gage instrument panel harness (CKT 27) for electrical power at ENGINE PRESS indicator gage.**

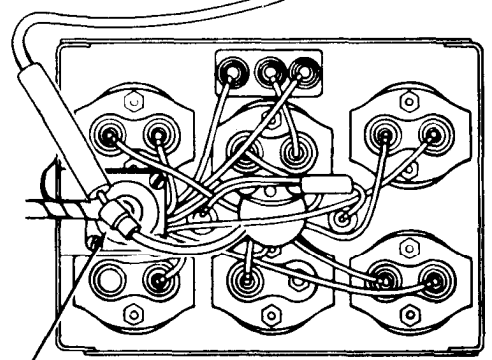
First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace gage instrument panel (page 10-111).
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Disconnect gage instrument panel harness connector (CKT 27) from ENGINE PRESS indicator gage.
- Connect red probe of meter to gage instrument panel harness connector (CKT 27) at ENGINE PRESS indicator gage and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

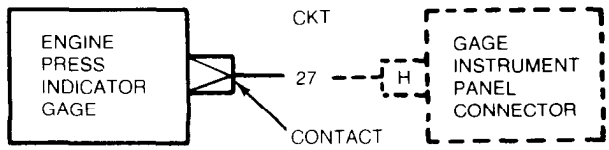
YES — NO





GAGE INSTRUMENT PANEL (REAR VIEW)

2 **Repair gage instrument panel harness (page 298).**



TA250301

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

Symptom-32

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

3 Check engine oil presssure transmitter for short to ground with engine running.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Reconnect gage instrument panel harness connector (CKT 27) to ENGINE PRESS indicator gage.

Second Technician (Rear of Crew Compartment)

- Remove engine lower access cover (page 17-13).
- Disconnect engine electrical harness connector (CKT 36) from engine oil pressure transmitter.

First Technician (Operator's Station)

- Start engine.

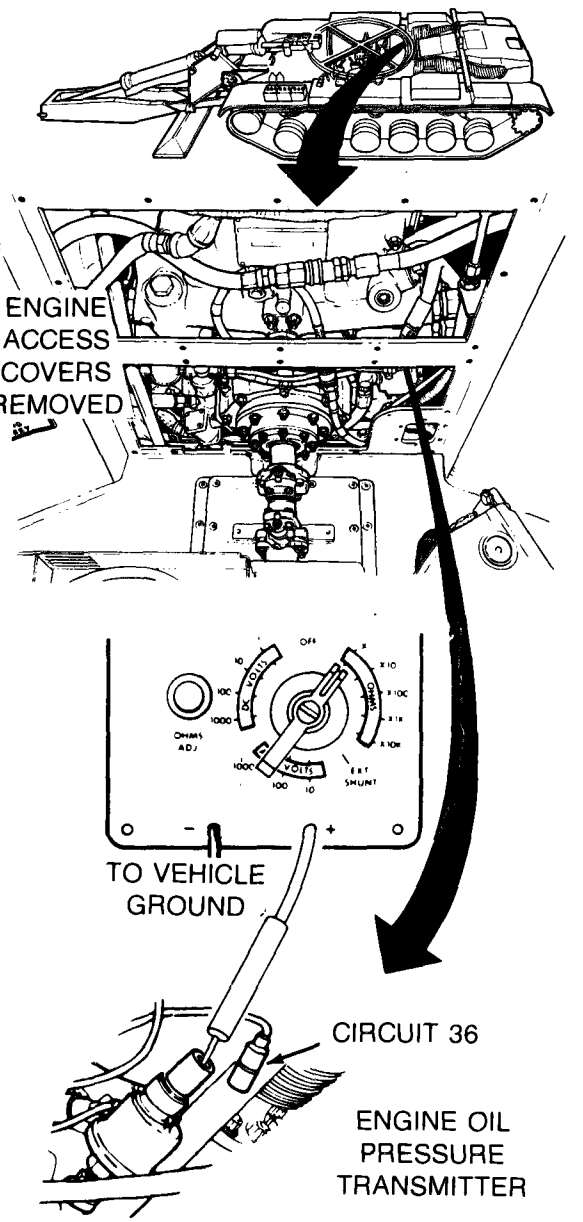
Second Technician (Rear of Crew Compartment)

- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to engine oil pressure transmitter contact and black probe to ground.
- Check if meter indicates continuity.

First Technician (Operator's Station)

- Stop engine.

Did meter indicate continuity, thereby indicating a short?



NO

4

- **Replace engine oil pressure transmitter (page 10-221).**
- **Install gage instrument panel (page 10-112).**

YES

TA250302

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

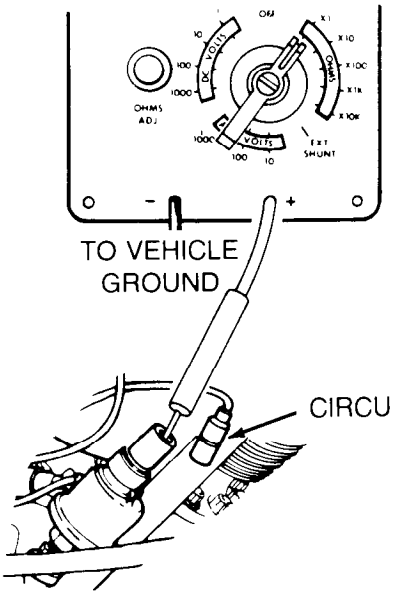
Symptom-32

5 **Check engine oil pressure transmitter for continuity to ground with engine not running.**

Second Technician (Rear of Crew Compartment)

- Connect red probe of meter to engine oil pressure transmitter contact (CKT 36) and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?



6

- **Replace engine oil pressure transmitter (page 10-221).**
- **Install gage instrument panel (page 10-112).**

NO

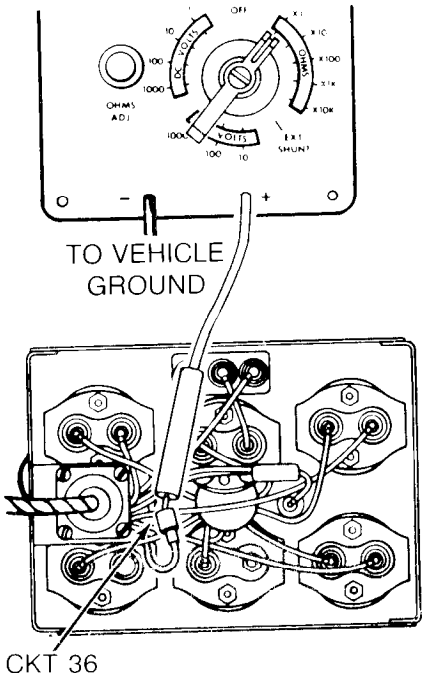
YES

7 **Check oil pressure indication circuit (CKT 36) at ENGINE PRESS indicator gage for short to ground.**

First Technician (Operator's Station)

- Disconnect gage instrument panel harness connector (CKT 36) from ENGINE PRESS indicator gage.
- Connect red probe of meter to gage panel harness connector (CKT 36) and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short?



8

- **Check gage instrument panel harness (CKT 36) for short to ground.**
- **See Step (20) .**

YES

NO

TA250303

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

Symptom-32

9 **Check CKT 36 for continuity from engine oil pressure transmitter to ENGINE PRESS indicator gage.**

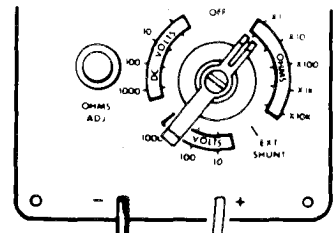
Second Technician (Rear of Crew Compartment)

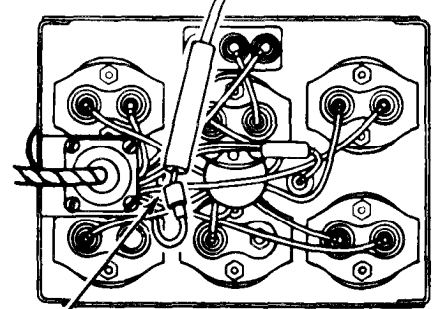
- Connect jumper wire from engine electrical harness connector (CKT 36) at engine oil pressure transmitter to ground.

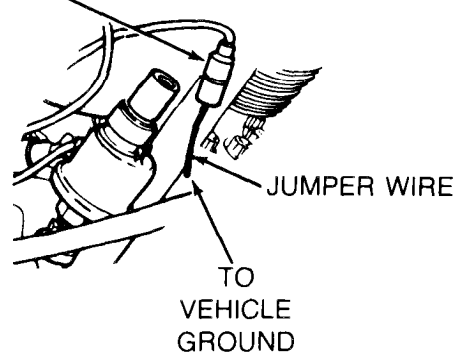
First Technician (Operator's Station)

- Connect red probe of meter to gage instrument panel harness connector (CKT 36) at ENGINE PRESS indicator gage and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?







NO

YES

10

- **Replace ENGINE PRESS indicator gage (page 10-117).**
- **Correct engine electrical harness connector to engine oil pressure transmitter.**
- **Install engine lower access cover (page 17-15).**

TA250304

Symptom-32

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

11 **Check gage instrument panel harness (CKT 36) for continuity from connector at ENGINE PRESS indicator gage to connector on instrument panel.**

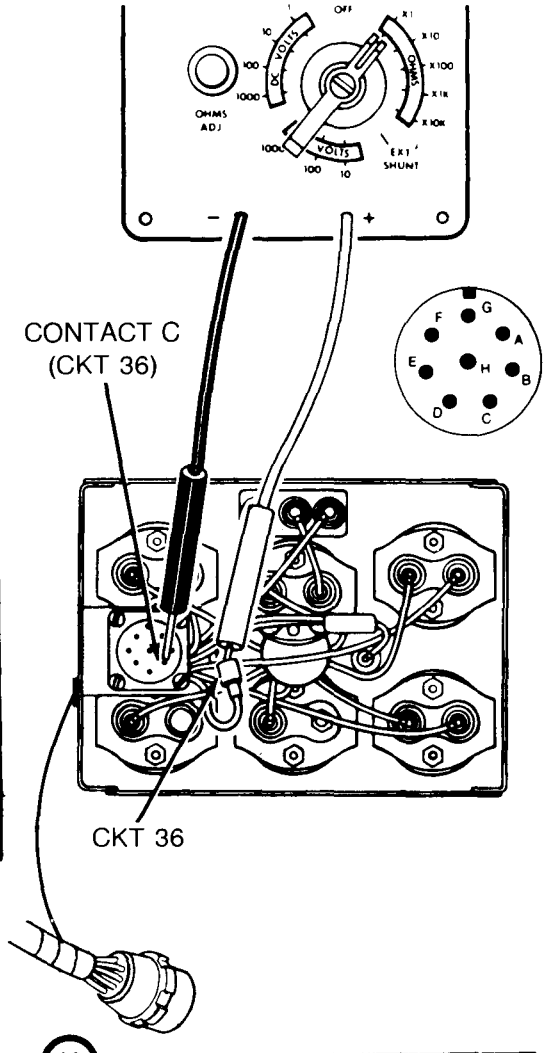
Second Technician (Rear of Crew Compartment)

- Reconnect engine electrical harness connector to engine oil pressure transmitter.
- Install engine lower access cover (page 17-15)..

First Technician (Operator's Station)

- Disconnect basket-indicator panel harness connector from gage instrument panel.
- Connect red probe of meter to gage instrument panel harness connector (CKT 36) at ENGINE PRESS indicator gage.
- Connect black probe of meter to contact C (CKT 36) of gage instrument panel connector.
- Check if meter indicates continuity.

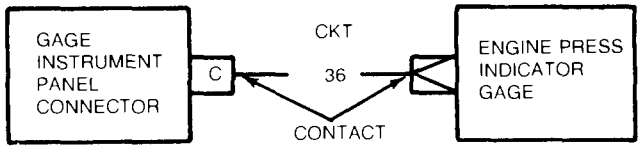
Does meter indicate continuity?



YES

NO

12 **Repair gage instrument panel harness (page 10-298).**



TA250305

Symptom-32

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

13 **Check basket-indicator panel harness (CKT 36) for continuity from connector at basket disconnect to connector at instrument panel.**

First Technician (Operator's Station)

- Reconnect gage instrument panel harness connector (CKT 36) to ENGINE PRESS indicator gage.
- At instrument panel connect jumper wire from contact C (CKT 36) of basket-indicator panel harness connector to ground.

Second Technician (Commander's Station)

- Displace basket-indicator panel harness connector (CKT 36) at basket disconnect.
- Connect red probe of meter to contact C (CKT 36) of basket-indicator panel harness connector and black probe to ground.
- Check if meter indicates continuity.

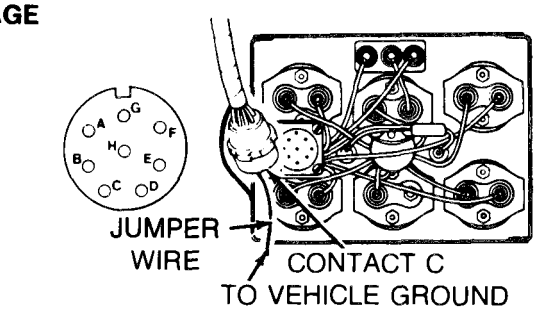
Does meter indicate continuity?

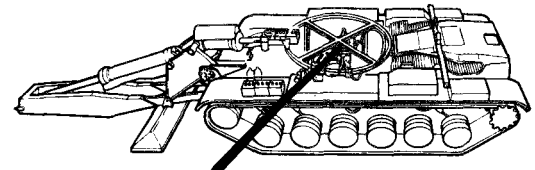
14

- **Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 36 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-indicator panel harness.**
- **Install basket-indicator panel harness connector at basket disconnect.**
- **Install gage instrument panel (page 10-112).**

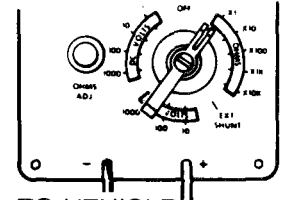
NO

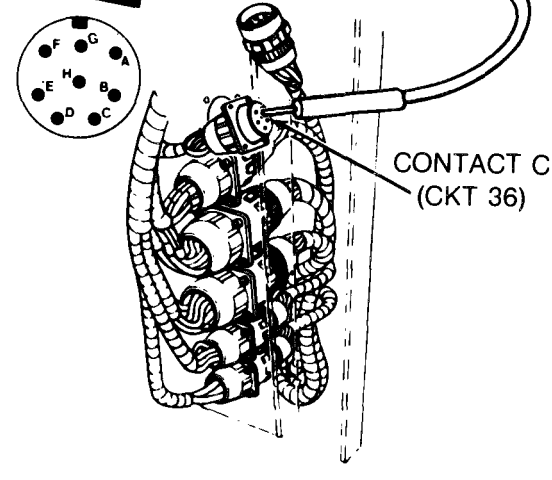
YES

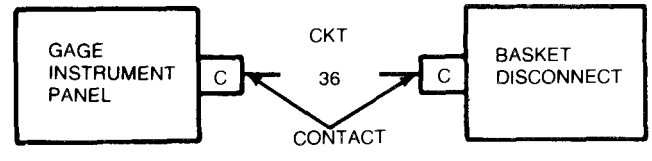




FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN







TA250306

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

Symptom-32

15 **Check front accessory harness (CKT 36) from connector at basket disconnect to connector at bulkhead disconnect for continuity.**

Second Technician (Commander's Station)

- Displace front accessory harness connector (CKT 36) at bulkhead disconnect (page 10-269).
- Connect black probe of meter to contact C (CKT 36) of front accessory harness connector at basket disconnect.
- Connect red probe of meter to contact F (CKT 36) of front accessory harness connector at bulkhead disconnect.
- Check if meter indicates continuity.

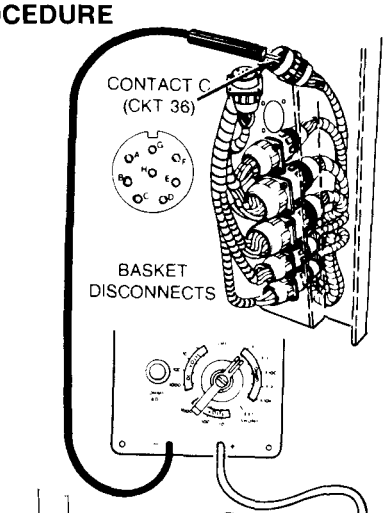
Does meter indicate continuity?

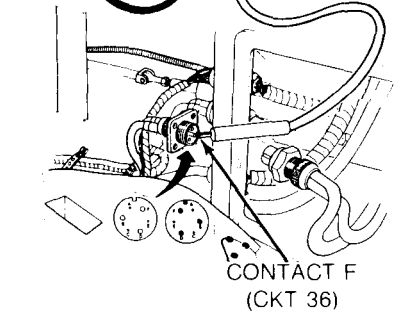
NO

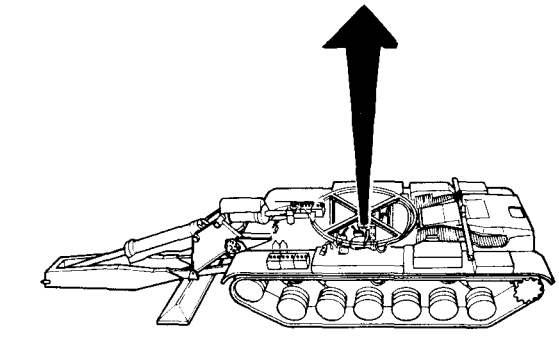
16

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 36 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**
- **Install basket-indicator panel harness connector at basket disconnect.**
- **Install gage instrument panel (page 10-112).**

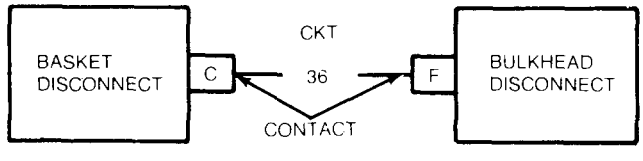
YES







FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



TA250307

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

Symptom-32

17 Check bulkhead engine disconnect harness (CKT 36) for continuity from connector at bulkhead disconnect to connector at engine disconnect.

First Technician (Operator's Station)

- Install gage instrument panel (page 10-112).

Second Technician (Commander's Station)

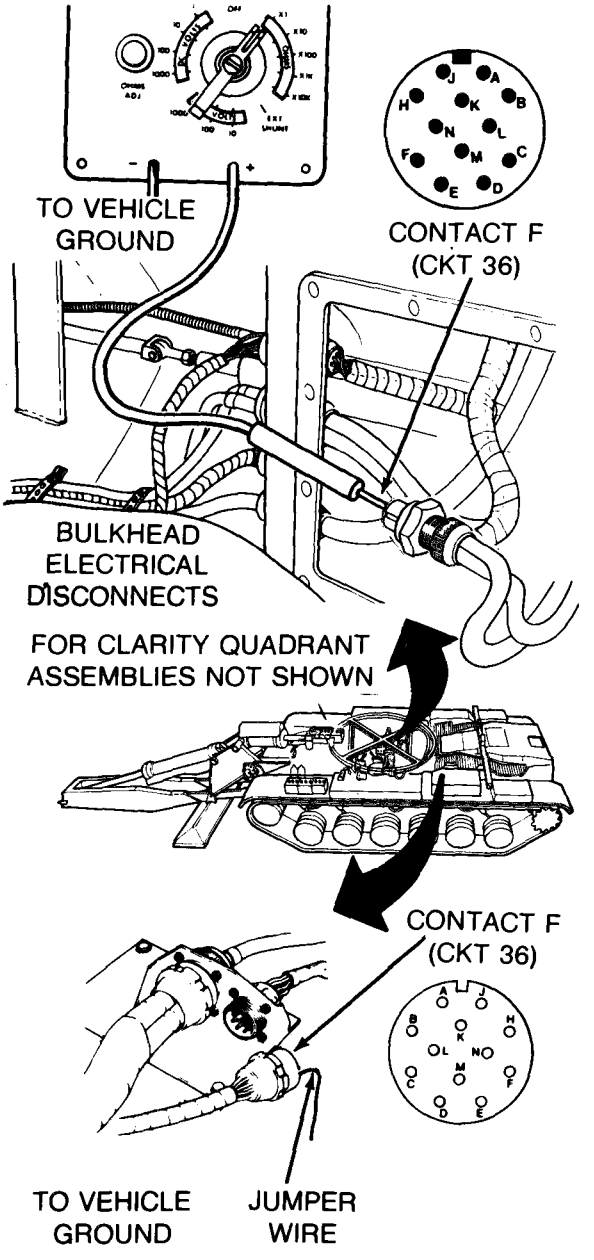
- Install basket-indicator panel harness connector at basket disconnect (page 10-270).

First Technician (Left Top Deck Grille Doors)

- Open left top deck grille doors.
- Disconnect bulkhead engine disconnect harness connector at engine disconnect.
- At engine disconnect, connect jumper wire from contact F (CKT 36) of bulkhead engine disconnect harness connector to ground.

Second Technician (Commander's Station)

- Connect red probe of meter to contact F (CKT 36) of bulkhead engine disconnect harness connector at bulkhead disconnect and black probe to ground.



TA250308

Symptom-32 **DETAILED TROUBLESHOOTING PROCEDURE**

STEP (17) CONTINUED **INDICATOR - GAGE**

(Continued)

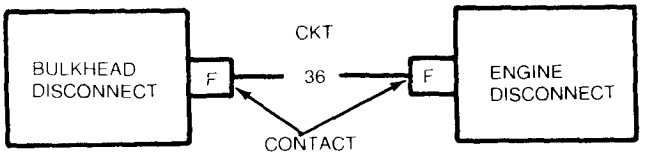
- Check if meter indicates continuity.

Does meter indicate continuity?

NO

18

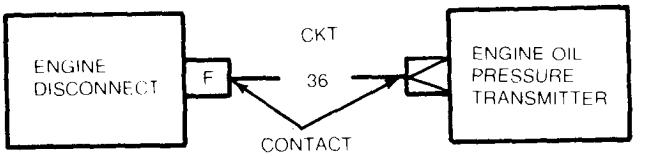
- **Inspect bulkhead engine disconnect harness for bent/ broken connector contacts or loose CKT 36 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.**
- **Connect bulkhead engine disconnect harness connector at engine disconnect.**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**



YES

19

- **Repair engine electrical harness (page 10-298).**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**



TA250309

Symptom-32
FROM STEP 8

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

20 **Check gage instrument panel harness (CKT 36) for short to ground.**

Second Technician (Rear of Crew Compartment)

- Connect engine electrical harness connector to engine oil pressure transmitter.
- Install engine lower access cover (page 17-14).

First Technician (Operator's Station)

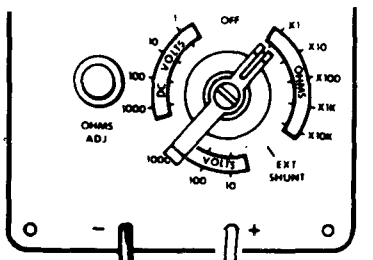
- Connect gage instrument panel harness connector to ENGINE PRESS indicator gage.
- Disconnect basket-indicator panel harness connector (CKT 36) from gage instrument panel.
- Connect red probe of meter to contact C (CKT 36) of gage instrument panel harness connector and black probe to ground.
- Check if meter indicates continuity.

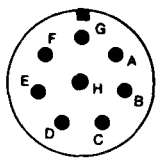
Does meter indicate continuity, thereby indicating a short?

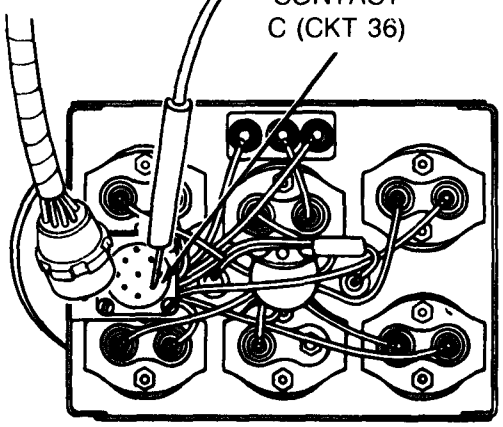
NO

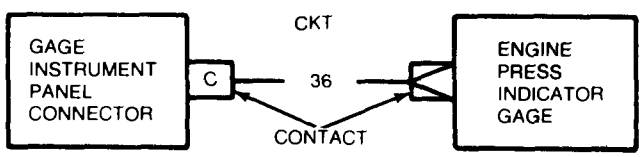
YES

21 **Repair gage instrument panel harness (page 10-298).**









TA250310

Symptom-32

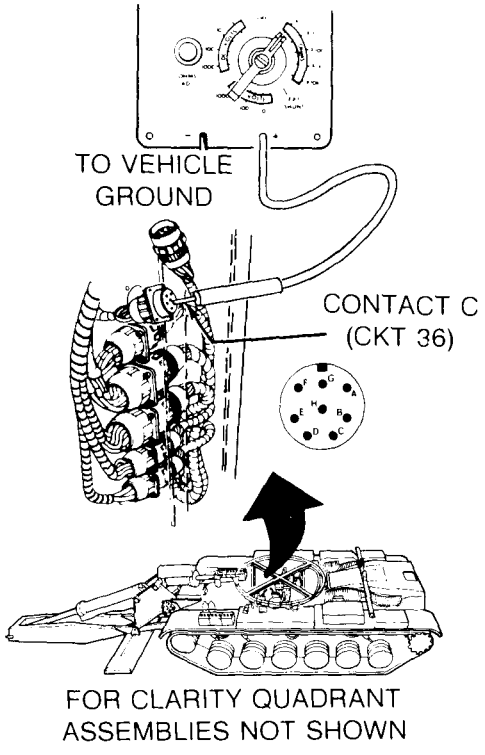
DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

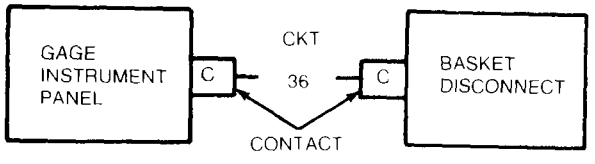
22 **Check basket-indicator panel harness (CKT 36) at basket disconnect for short to ground.**

Second Technician (Commander's Station)

- Displace basket-indicator panel harness connector (CKT 36) at basket disconnect.
- Connect red probe of meter to contact C (CKT 36) of basket-indicator panel harness connector at basket disconnect and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short?





NO

YES

23

- **Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 36 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-indicator panel harness.**
- **Install basket-indicator panel harness connector at basket disconnect.**
- **Install gage instrument panel (page 10-112).**

TA250311

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

Symptom-32

24 **Check front accessory harness (CKT 36) for short to ground.**

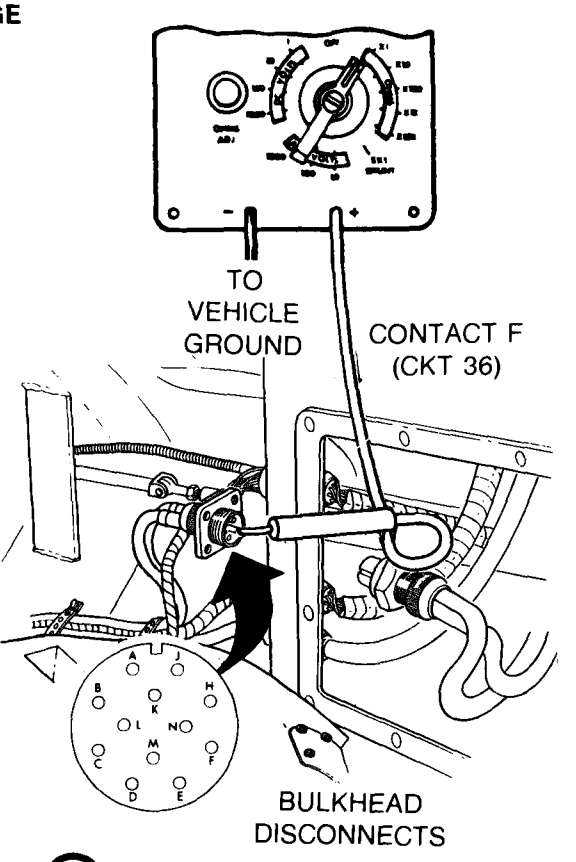
First Technician (Operator's Station)

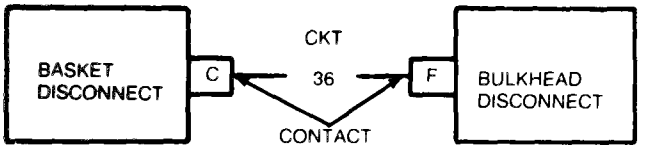
- Install gage instrument panel (page 10-112).

Second Technician (Commander's Station)

- Install basket-indicator panel harness connector at basket disconnect.
- Displace front accessory harness connector (CKT 36) at bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact F (CKT 36) of front accessory harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short?





NO

YES

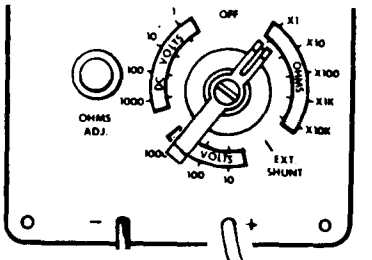
25

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 36 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a bad front accessory harness.**
- **Install front accessory harness connector at bulkhead disconnect.**

TA250312

Symptom-32

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)



TO VEHICLE GROUND

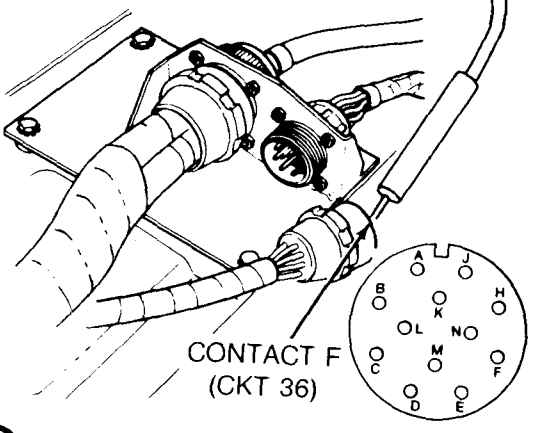
26 **Check bulkhead engine disconnect harness (CKT 36) for short to ground.**

Second Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).

First Technician (Left Top Deck Grille Doors)

- Open left top deck grille doors.
- Disconnect bulkhead engine disconnect harness connector (CKT 36) at engine disconnect.
- Connect red probe of meter to contact F (CKT 36) of bulkhead engine disconnect harness connector and black probe to ground.
- Check if meter indicates continuity.



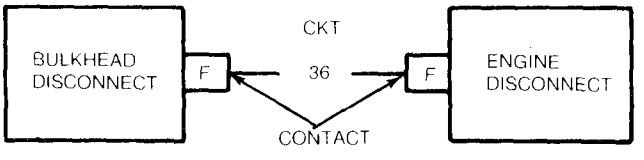
CONTACT F (CKT 36)

Does meter indicate continuity, thereby indicating a short?

YES

27

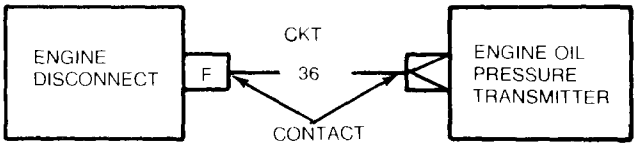
- **Inspect bulkhead engine disconnect harness for bent/ broken connector contacts or loose CKT 36 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.**
- **Reconnect bulkhead engine disconnect harness connector at engine disconnect.**



NO

28

- **Repair engine electrical harness (page 10-298).**



TA250313

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE

Symptom-33

ENGINE OIL TEMPERATURE GAGE SHOWS HIGH OR NO TEMPERATURE (POWERPLANT WARNING LAMP NOT ON — ENGINE RUNNING — ALL OTHER GAGES READ NORMAL).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

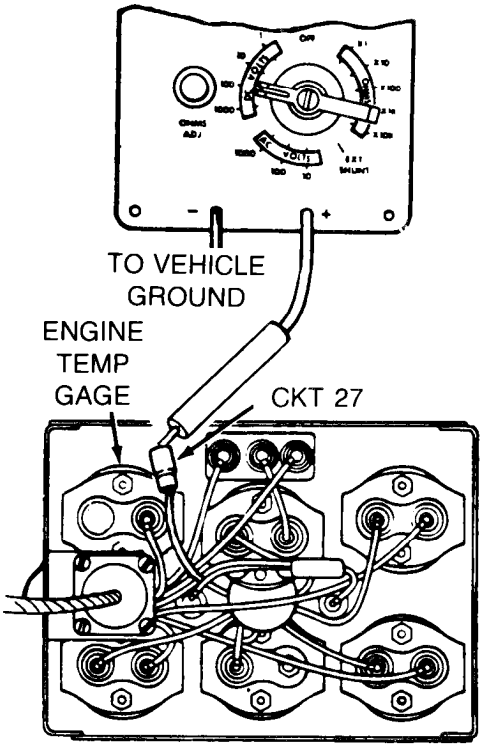
1 Check gage instrument panel harness (CKT 27) at ENGINE TEMP indicator gage for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace gage instrument panel (page 10-111).
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Disconnect gage instrument panel harness connector (CKT 27) from ENGINE TEMP indicator gage.
- Connect red probe of meter to gage instrument panel harness connector (CKT 27) and black probe to vehicle ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

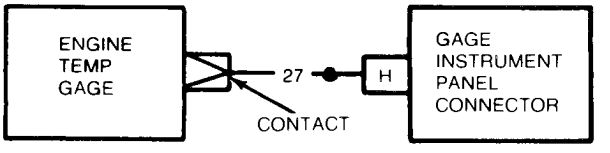
Does meter indicate 18 to 30 volts dc?

YES — NO



GAGE INSTRUMENT PANEL (REAR VIEW)

2 Repair gage instrument panel harness (page 10-298).



TA250314

Symptom-33

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

NOTE

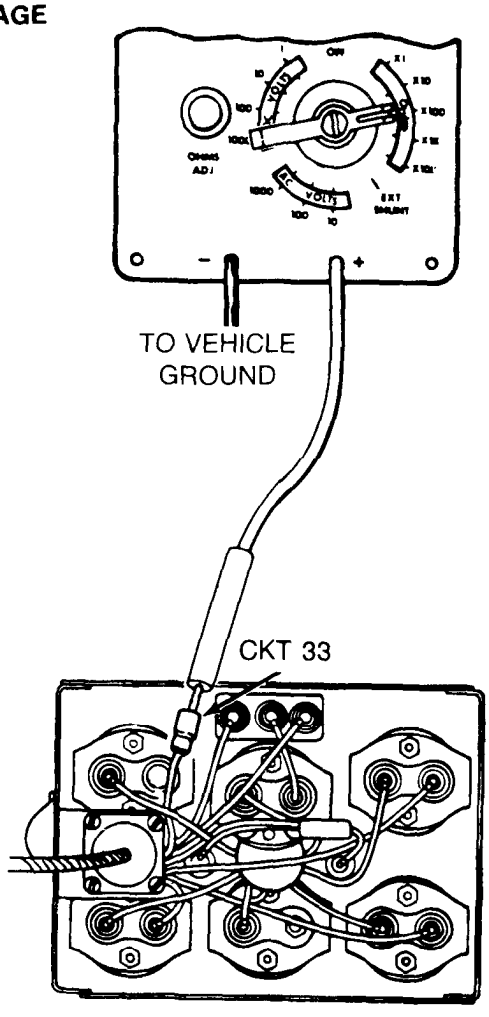
This check is to be performed with engine cold.

3 **Check circuit 33 for proper resistance from gage instrument panel harness connector through engine oil temperature transmitter (engine cold).**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Reconnect gage instrument panel harness connector (CKT 27) to ENGINE TEMP indicator gage.
- Set multimeter to OHMS X100 scale and "zero" meter, or use STE/ICE Test No. 92 (page 4-83).
- Disconnect gage instrument panel harness connector (CKT 33) from ENGINE TEMP indicator gage.
- Connect red probe of meter to gage instrument panel harness connector (CKT 33) and black probe to ground.
- Check if meter indicates less than 2000 OHMS or more than 2000 OHMS.

Does meter indicate less than or more than 2000 OHMS?



MORE

LESS

4

- **Check engine oil temperature transmitter for proper resistance.**
- **See Step (10).**

TA250315

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

Symptom-33

5 **Check circuit 33 for continuity from gage instrument panel harness connector to engine electrical harness connector at engine oil temperature transmitter.**

Second Technician (Crew Compartment)

- Remove engine upper access cover (page 17-11).
- Disconnect engine electrical harness connector (CKT 33) from engine oil temperature transmitter.
- Connect jumper wire from electrical harness connector (CKT 33) to ground.

First Technician (Operator's Station)

- Set multimeter to OHMS XI scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to gage instrument panel harness connector (CKT 33) at ENGINE TEMP indicator gage and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?

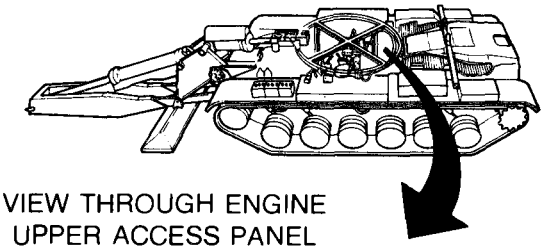
6 **Check gage instrument panel harness (CKT 33) for continuity from connector at ENGINE TEMP indicator gage to connector on instrument panel.**

NO

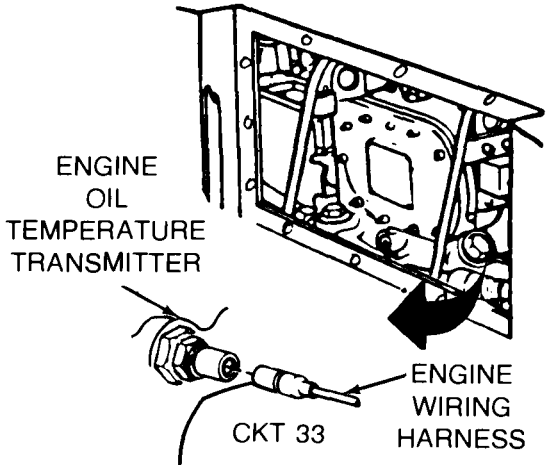
- **See Step (21).**

YES

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



VIEW THROUGH ENGINE UPPER ACCESS PANEL



TA250316

Symptom-33

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

NOTE

This check is to be performed with engine warm.

7 **Check engine oil temperature transmitter for proper resistance.**

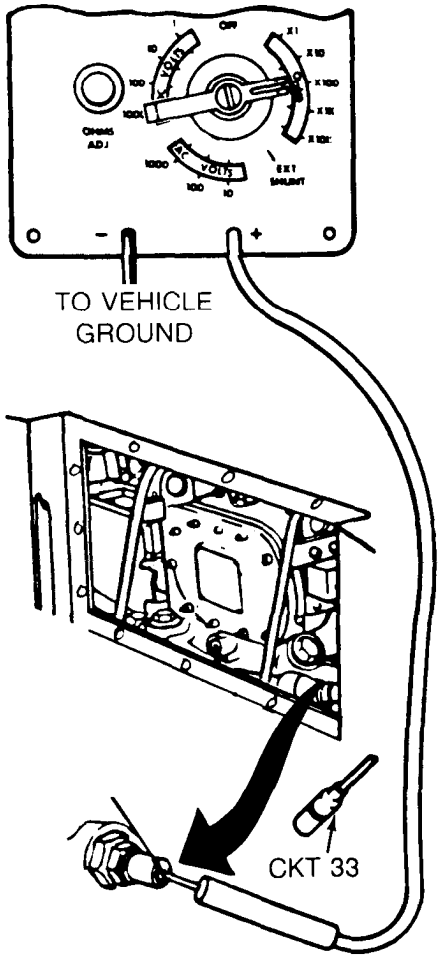
First Technician (Operator's Station)

- Connect gage instrument panel harness connector (CKT 33) to ENGINE TEMP indicator gage.
- Start engine and allow to warm up completely.
- Stop engine.

Second Technician (Crew Compartment)

- Set multimeter OHMS X100 scale and "zero" meter, or use STE/ICE Test No. 92 (page 4-83).
- Connect red probe of meter to contact of engine oil temperature transmitter and black probe to ground.
- Check meter for indication of more than or less than 2600 OHMS.

Does meter indicate more than or less than 2600 OHMS?



MORE

8
- **Replace engine oil temperature transmitter (page 10-224).**
- **Install gage instrument panel (page 10-112).**

LESS

9
- **Replace ENGINE TEMP indicator gage (page 10-125).**
- **Install upper engine access cover (page 17-12).**

TA250317

Symptom-33

FROM STEP 4

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

10 Check engine oil temperature transmitter for proper resistance.

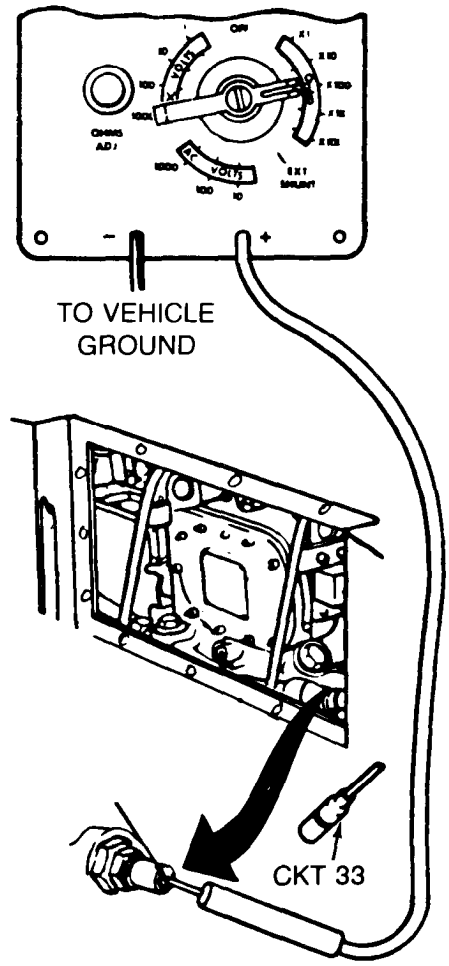
First Technician (Operator's Station)

- Connect gage instrument panel harness connector (CKT 33) to ENGINE TEMP indicator gage.

Second Technician (Crew Compartment)

- Remove engine upper access cover (page 17-11).
- Disconnect engine electrical harness connector (CKT 33) from engine oil temperature transmitter.
- Connect red probe of meter to contact of engine oil temperature transmitter and black probe to ground.
- Check if meter indicates more than or less than 2000 OHMS.

Does meter indicate more than or less than 2000 OHMS?



MORE

LESS

11

- **Replace engine oil temperature transmitter (page 10-224).**
- **Install gage instrument panel (page 10-112).**

TA250318

Symptom-33

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

12 **Check gage instrument panel harness (CKT 33) for short to ground.**

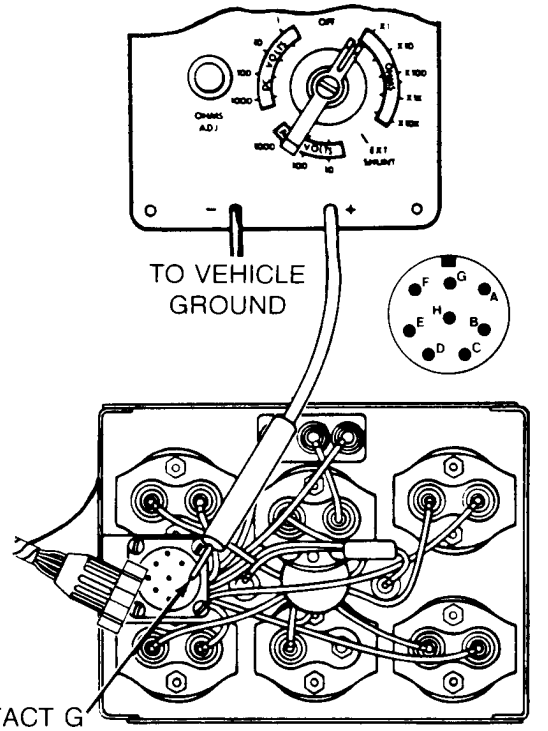
Second Technician (Crew Compartment)

- Connect engine electrical harness connector to engine oil temperature transmitter.
- Install engine upper access cover (page 17-12).

First Technician (Operator's Station)

- Disconnect basket-indicator panel harness connector from gage instrument panel.
- Set multimeter to OHMS XI scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact G (CKT 33) of gage instrument panel harness connector and black probe to ground.
- Check if meter indicates continuity.

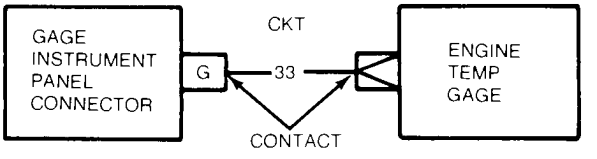
Does meter indicate continuity, thereby indicating a short?



13 **Repair gage instrument panel harness (page 10-298).**

YES

NO



TA250319

Symptom-33

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

14 **Check basket-indicator panel harness at basket disconnect for short to ground.**

First Technician (Operator's Station)

- Connect basket-instrument panel harness connector to gage indicator panel.

Second Technician (Commander's Station)

- Displace basket-indicator panel harness connector (CKT 33) at basket disconnect.
- Connect red probe of meter to contact G (CKT 33) of basket-indicator panel harness connector and black probe to ground.
- Check if meter indicates continuity.

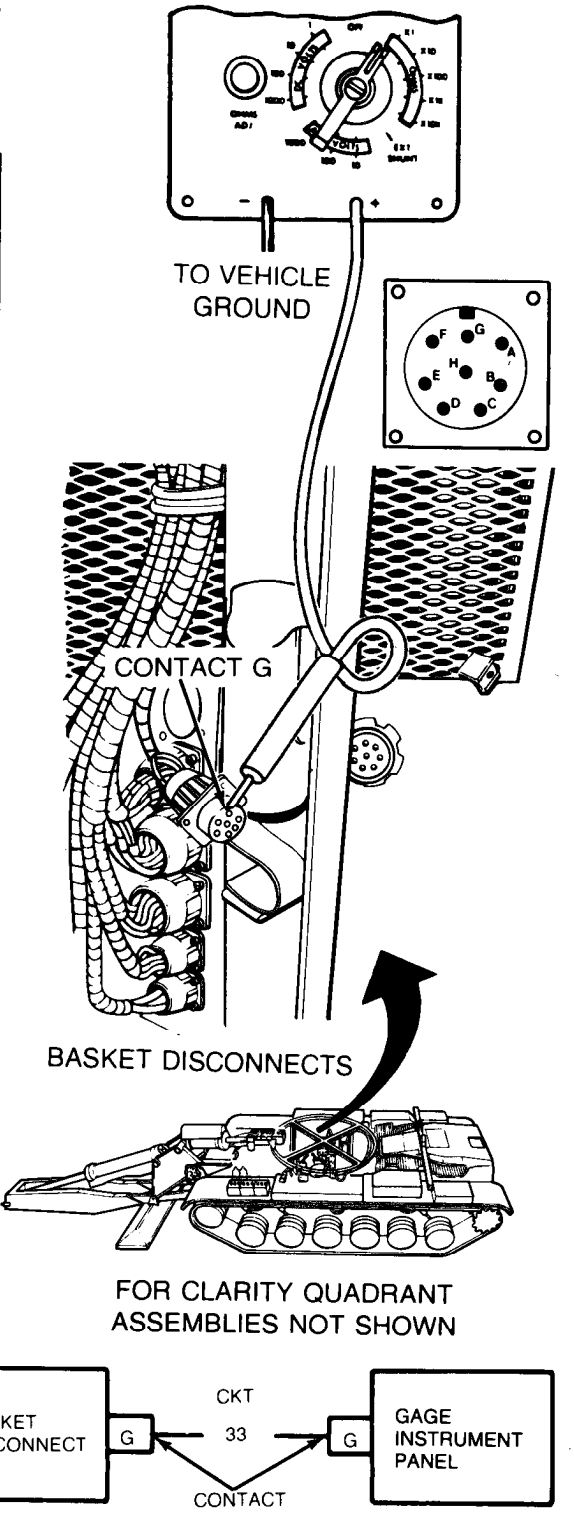
Does meter indicate continuity, thereby indicating a short?

YES

15

- **Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 33 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket to indicator panel harness.**
- **Connect gage instrument panel harness connector to ENGINE TEMP indicator gage.**
- **Install gage instrument panel (page 10-112).**

NO

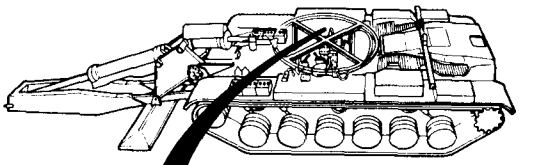


TA250320

Symptom-33

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

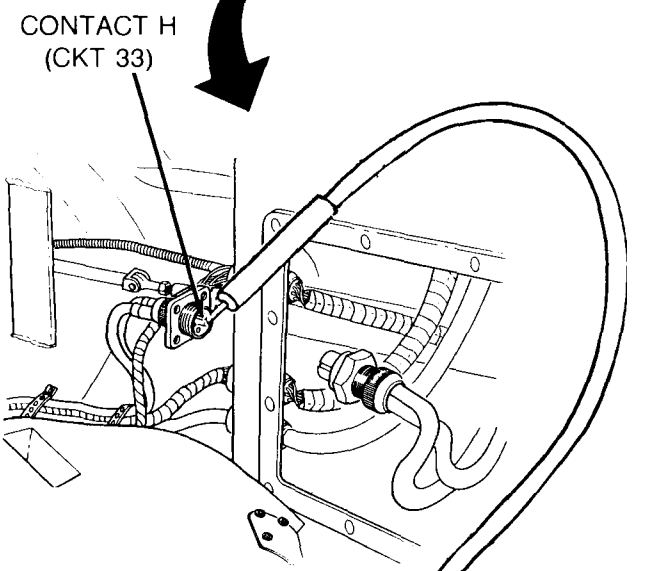


16 **Check front accessory harness (CKT 33) at bulkhead disconnect for short to ground.**

Second Technician (Commander's Station)

- Install basket-indicator panel harness (CKT 33) at basket disconnect.
- Displace front accessory harness connector at bulkhead disconnects (page 10-269).
- Connect red probe of meter to contact H (CKT 33) of front accessory harness connector at bulkhead disconnect and black probe to ground.
- Check if meter indicates continuity.

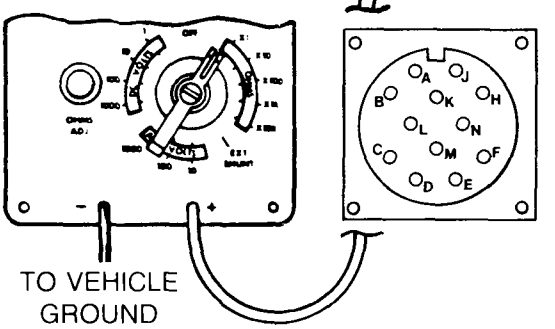
Does meter indicate continuity, thereby indicating a short?



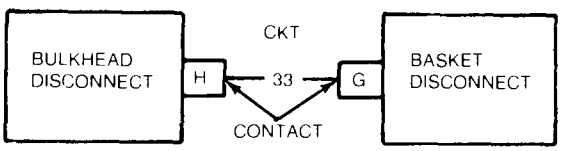
YES

17

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 33 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**
- **Connect gage instrument panel harness connector to ENGINE TEMP indicator gage.**
- **Install gage instrument panel (page 10-112).**



NO



TA250321

Symptom-33

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

18 **Check bulkhead engine disconnect harness (CKT 33) at engine disconnect for short to ground.**

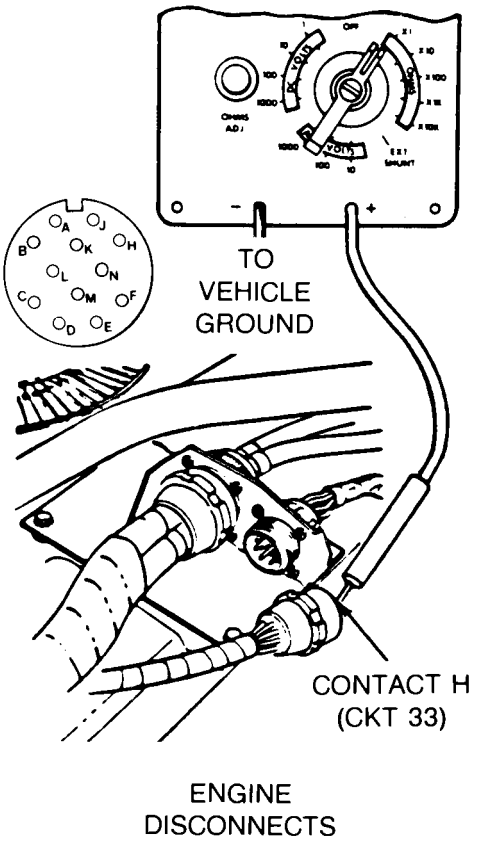
Second Technician (Commander's Station)

- Reinstall front accessory harness connector at bulkhead disconnects (page 10-270).

First Technician (Left Top Deck Grille Doors)

- Open left top deck grille doors to gain access to engine disconnects.
- Disconnect bulkhead engine disconnect harness connector at engine disconnects.
- Connect red probe of meter to contact H (CKT 33) of bulkhead engine disconnect harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity to ground, thereby indicating a short?

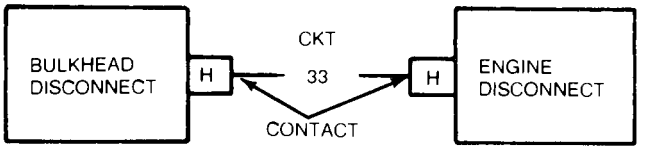


YES

19
- **Inspect bulkhead engine disconnect harness for bent/ broken connector contacts or loose CKT 33 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.**
- **Reconnect bulkhead engine disconnect harness connector to engine disconnect.**

NO

20 **Repair engine electrical harness (page 10-298).**



TA250322

Symptom-33
FROM STEP
6

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

21 **Check gage instrument panel harness (CKT 33) for continuity from connector at ENGINE TEMP indicator gage to connector on instrument panel.**

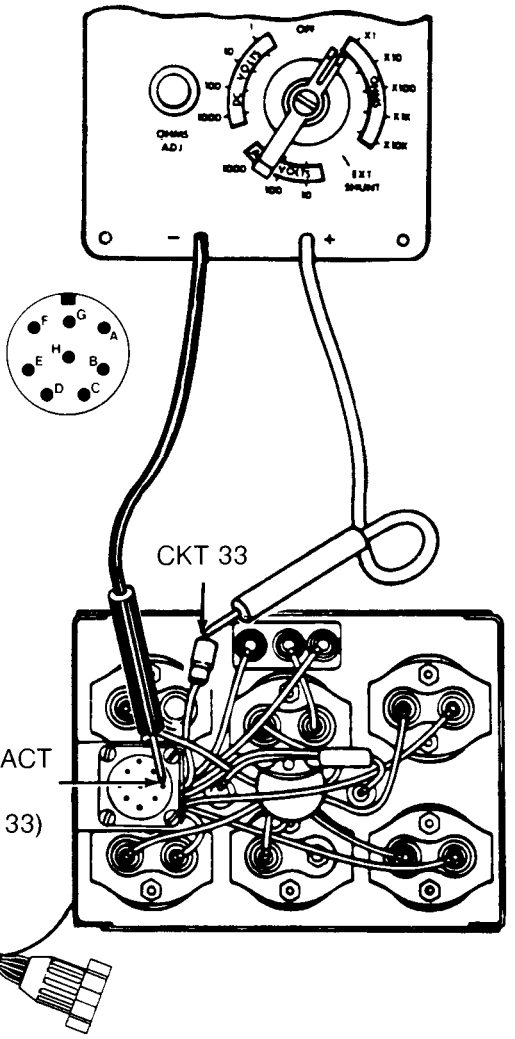
Second Technician (Crew Compartment)

- Reconnect engine electrical harness connector (CKT 33) to engine oil temperature transmitter.
- Install engine upper access cover (page 17-12).

First Technician (Operator's Station)

- Disconnect basket-indicator panel harness connector from gage instrument panel.
- Connect red probe of meter to gage instrument panel harness connector (CKT 33) at ENGINE TEMP indicator gage.
- Connect black probe of meter to contact G (CKT 33) of gage instrument panel connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

NO

22 **Repair gage instrument panel harness (page 10-298).**

TA250323

Symptom-33

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

23 **Check basket-indicator panel harness (CKT 33) for continuity from connector to gage instrument panel to connector at basket disconnect.**

First Technician (Operator's Station)

- Reconnect gage instrument panel harness (CKT 33) to ENGINE TEMP indicator gage.
- Connect black probe of meter to contact G (CKT 33) of basket-indicator panel harness connector at gage instrument panel.

Second Technician (Commander's Station)

- Displace basket-indicator panel harness connector (CKT 33) from basket disconnects.
- Connect red probe meter to contact G (CKT 33) of basket-indicator panel harness connector at basket disconnect.
- Check if meter indicates continuity.

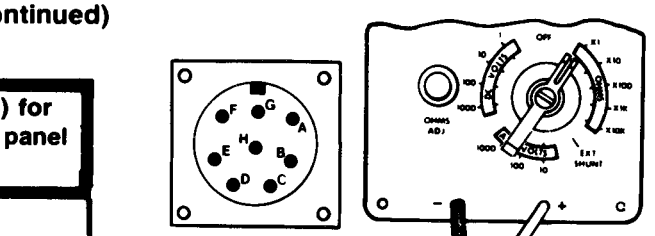
Does meter indicate continuity?

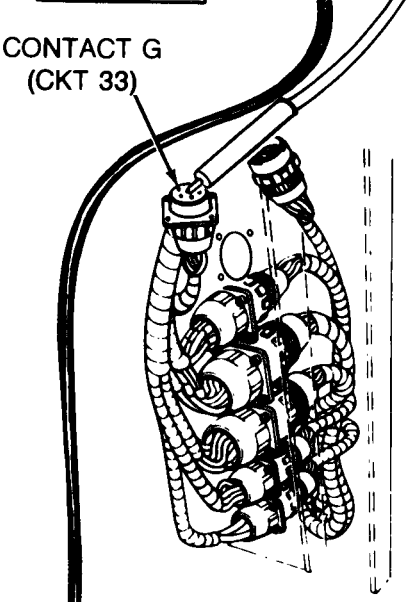
24

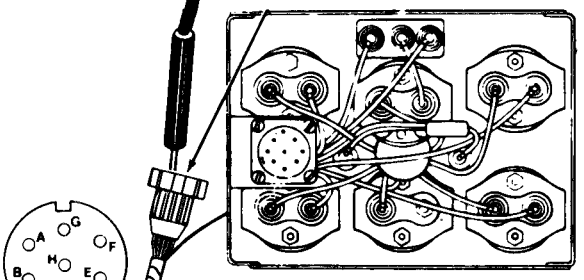
- **Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 33 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective notify support maintenance of a defective basket-indicator panel harness.**
- **Install gage instrument panel (page 10-112).**
- **Install basket-indicator panel harness connector at basket disconnect.**

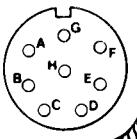
NO

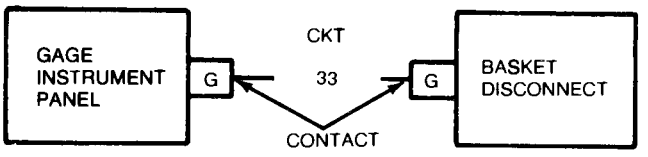
YES











TA250324

Symptom-33

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

25 **Check front accessory harness (CKT 33) for continuity from connector at basket disconnect to connector at bulkhead disconnect.**

First Technician (Operator's Station)

- Reconnect basket-indicator panel harness conector to gage instrument panel.
- Install gage instrument panel (page 10-112).

Second Technician (Commander's Station)

- Displace front accessory harness connector (CKT 33) at bulkhead disconnects (page 10-269).
- Connect red probe of meter to contact G (CKT 33) of front accessory harness connector at basket disconnect.
- Connect black probe of meter to contact H (CKT 33) of front accessory harness connector at bulkhead disconnect.
- Check if meter indicates continuity.

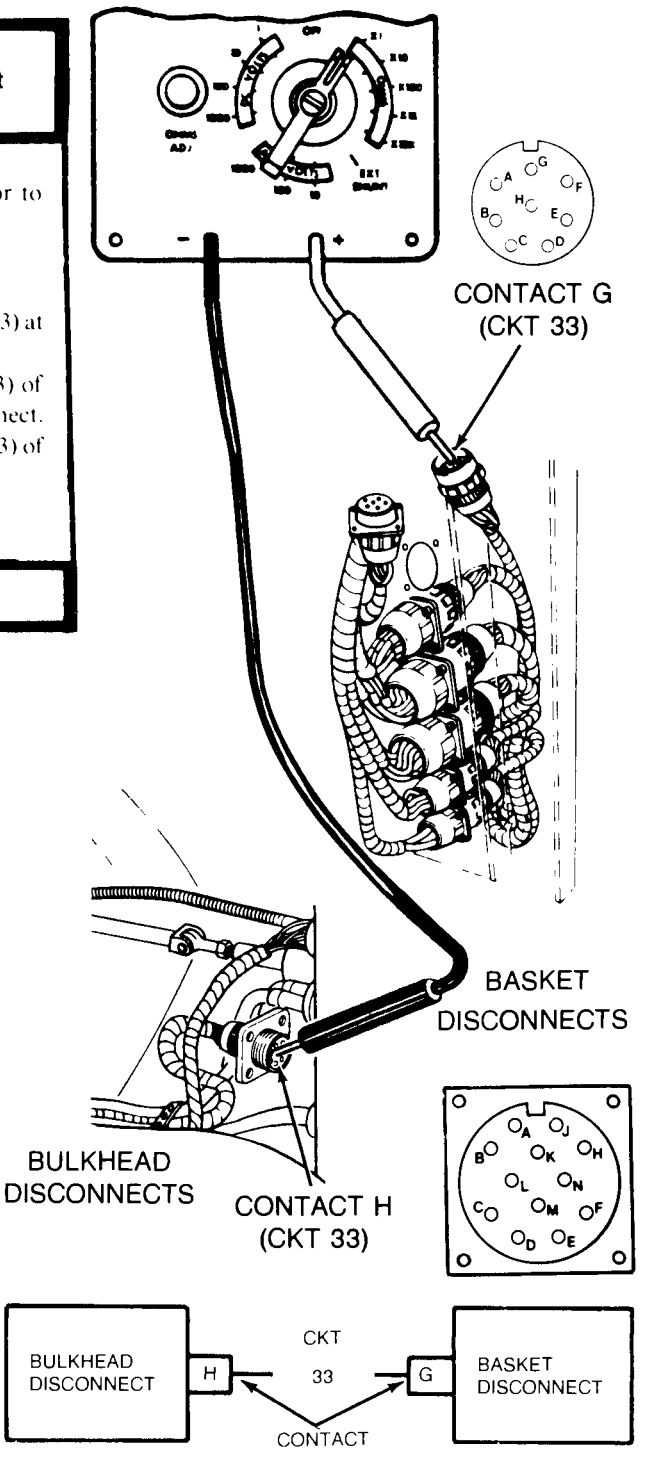
Does meter indicate continuity?

26

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 33 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective notify support maintenance of a defective front accessory harness.**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**
- **Install basket-indicator panel harness connector at basket disconnect.**

NO

YES



TA250325

Symptom-33

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

27 **Check bulkhead engine disconnect harness (CKT 33) for continuity from connector at bulkhead disconnect to connector at engine disconnect.**

Second Technician (Commander's Station)

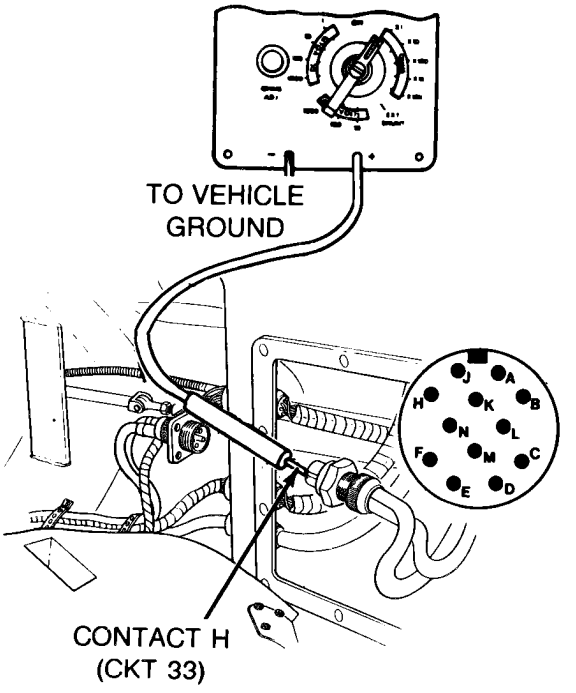
- Install basket-indicator panel harness connector at basket-disconnect.

First Technician (Left Top Deck Grille Doors)

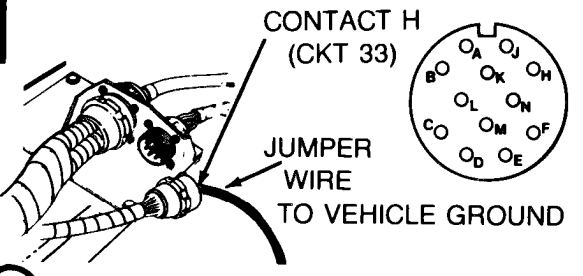
- Open left top deck grille doors.
- Disconnect bulkhead engine disconnect harness connector (CKT 33) at engine disconnects.
- At engine disconnect, connect jumper wire from contact H (CKT 33) of bulkhead engine disconnect harness connector to ground.

Second Technician (Commander's Station)

- Connect red probe of meter to contact H (CKT 33) of bulkhead engine disconnect harness connector at bulkhead disconnect and black probe to ground.
- Check if meter indicates continuity.



Does meter indicate continuity?

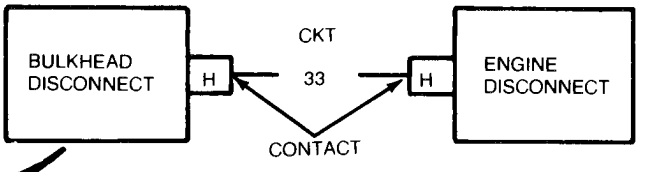


NO

28
- **Inspect bulkhead engine disconnect harness for bent/ broken connector contacts or loose CKT 33 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.**
- **Install front accessory harness connector at bulkhead disconnects (page 10-270).**
- **Connect bulkhead engine disconnect harness connector to engine disconnect.**

YES

29
- **Repair engine electrical harness (page 10-298).**
- **Install front accessory harness connector at bulkhead disconnects (page 10-270).**



TA250326

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE

Symptom-34

TRANSMISSION OIL PRESSURE GAGE SHOWS NO PRESSURE (ENGINE RUNNING - ALL OTHER GAGES READ NORMAL).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check transmission for full oil level.

First Technician (Top Deck)

- Open left top deck grille doors (TM 5-5420-202-10).

Second Technician (Operator's Station)

- Start engine.

First Technician (Top Deck)

- Check transmission oil level (TM 5-5420-202-10).

Is transmission full of oil?

NO

2
- **Check oil coolers for evidence of leaks.**
- **See Step (19).**

YES

3
- **Check for transmission oil pressure of 4 to 40 psi.**
- **See Step (4).**

TA250327

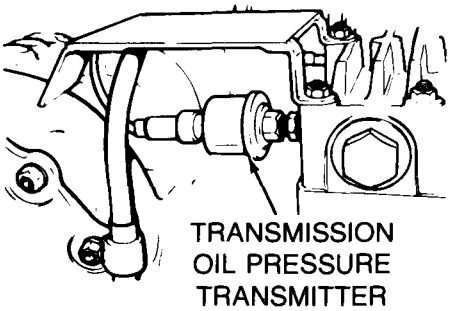
Symptom-34

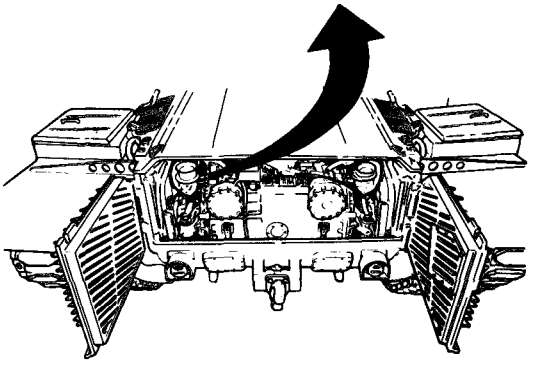
FROM STEP 3 OR 22

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

WARNING

Do not operate engine above idle when personnel are working between rear grille doors.





4 Check for transmission oil pressure of 4 to 40 psi.

Second Technician (Operator's Station)
- Stop engine.

Both Technicians (Rear Grille Doors)
- Remove transmission shroud (page 9-2).

First Technician (Rear Grille Doors)
- Disconnect transmission harness connector (CKT 321) from transmission oil pressure transmitter.
- Remove oil pressure transmitter (page 10-231).
- If STE/ICE is available, install STE/ICE pressure test fittings in transmission and perform Test No. 50: pressure 0-1000 psig. (page 4-88).
- If STE/ICE is not available, install pressure gage (P/N 7950330) in transmission.

Second Technician (Operator's Station)
- Start engine.

First Technician (Rear Grille Doors)
- Check if STE/ICE or gage indicates 4 to 40 psi with engine running.

Does meter/gage indicate 4 to 40 psi?

YES

NO

5
- **Stop engine.**
- **Remove pressure test equipment from transmission.**
- **Install oil pressure transmitter (page 10-232).**
- **Connect transmission harness connector to oil pressure transmitter.**
- **Install transmission shroud (page 9-6).**
- **Notify support maintenance of transmission problem.**

TA250328

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

Symptom-34

6 **Check transmission harness connector (CKT 321) for electrical power at oil pressure transmitter connector.**

Second Technician (Operator's Station)

- Stop engine.

First Technician (Rear Grille Doors)

- Set multimeter to measure 10 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to transmission harness oil pressure transmitter connector and black probe to ground.

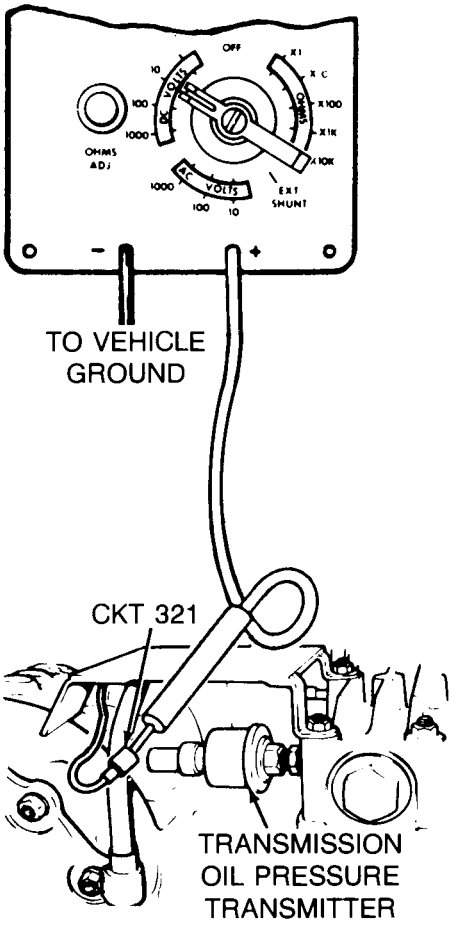
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Rear Grille Doors)

- Check if meter indicates more than 2 volts dc.

Does meter indicate more than 2 volts dc?



NO

YES

7 **Replace transmission oil pressure transmitter (page 10-231).**

TA250329

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

Symptom-34

8 **Check front accessory harness connector (CKT 321) for electrical power at bulkhead disconnect.**

Second Technician (Operator's Station)
- Set MASTER BATTERY switch OFF.

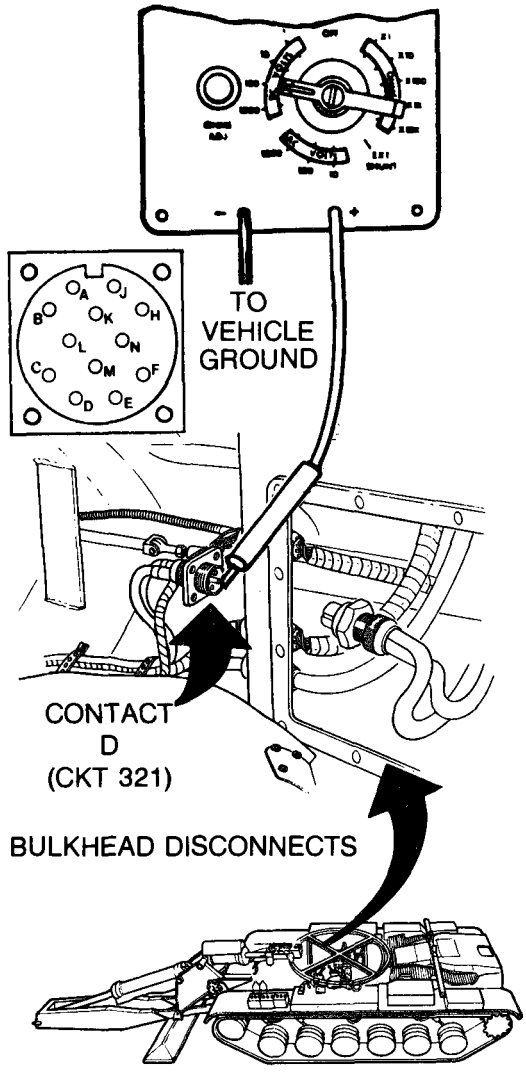
First Technician (Rear Grille Doors)
- Remove pressure test equipment from transmission.
- Install transmission pressure transmitter on transmission (page 10-232).
- Connect transmission harness connector (CKT 321) to oil pressure transmitter.

First Technician (Commander's Station)
- Displace front accessory harness connector from bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact D (CKT 321) of front accessory harness connector and black probe to ground.

Second Technician (Operator's Station)
- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)
- Check if meter indicates more than 2 volts dc.

Does meter indicate more than 2 volts dc?



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

NO

YES

9
- **Check bulkhead engine disconnect harness (CKT 321) for continuity from connector at engine disconnect to connector at bulkhead disconnect.**

- **See Step (24) .**

TA250330

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

Symptom-34

10 **Check basket-indicator panel harness connector (CKT 321) at basket disconnect for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Displace basket-indicator panel harness connector (CKT 321) at basket disconnect (page 10-269).
- Connect red probe of meter to contact A (CKT 321) of basket-indicator panel harness connector and black probe to ground.

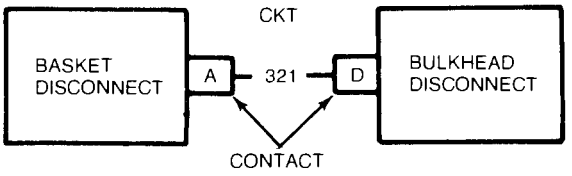
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

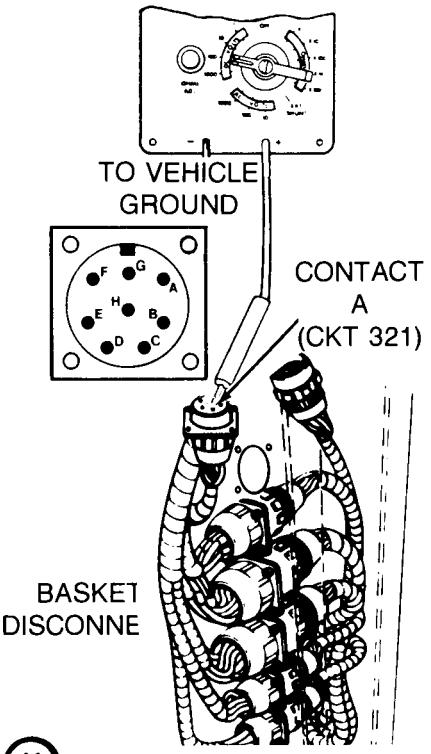
- Check if meter indicates more than 2 volts dc.

Does meter indicate more than 2 volts dc?



NO

YES



11

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 321 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Install transmission shroud (page 9-6).**
- **Install front accessory harness connector at basket disconnect.**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**

TA250331

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

Symptom-34

12 **Check gage instrument panel harness (CKT 27) for electrical power at TRANSMISSION PRESS indicator gage.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).

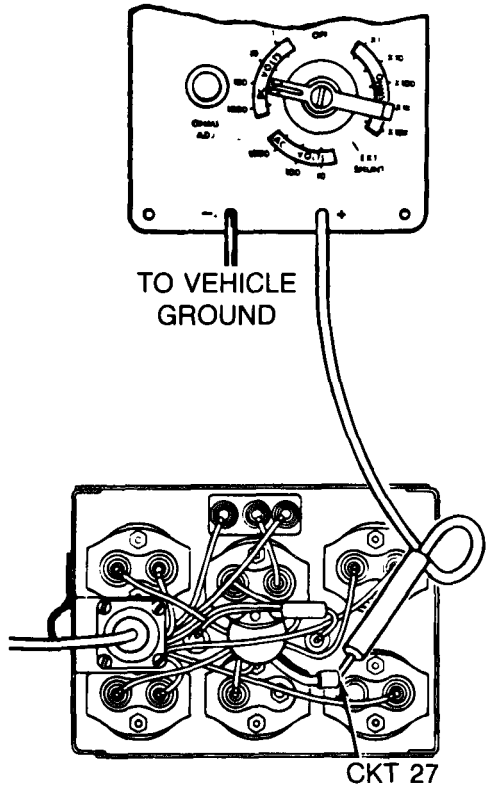
Second Technician (Operator's Station)

- Displace gage instrument panel (page 10-111).
- Disconnect gage instrument panel harness connector (CKT 27) from TRANSMISSION PRESS indicator gage.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to gage instrument panel harness connector (CKT 27) and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

YES

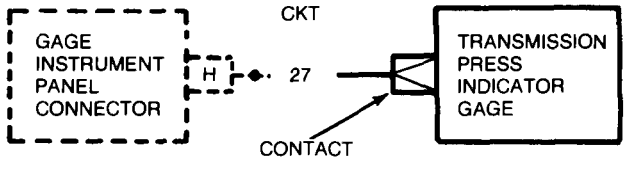
NO



GAGE INSTRUMENT PANEL (REAR VIEW)

13

- **Repair gage instrument panel harness (page 10-298).**
- **Install basket-indicator panel harness connector (CKT 321) at basket disconnect.**
- **Install transmission shroud (page 9-6).**



TA250332

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

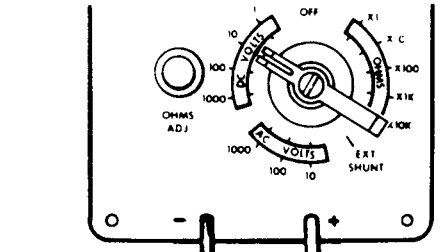
Symptom-34

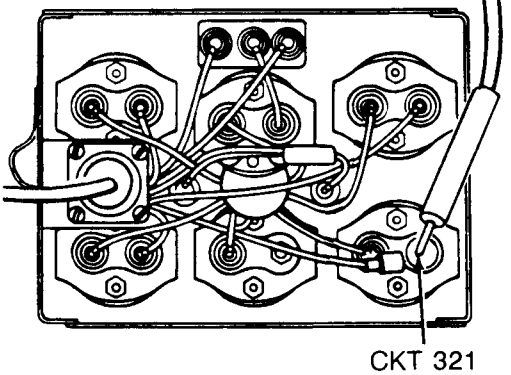
14 **Check transmission oil pressure gage for electrical power at CKT 321 connector.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Connect gage instrument panel harness connector (CKT 27) to TRANSMISSION PRESS gage.
- Disconnect gage instrument panel harness (CKT 321) from TRANSMISSION PRESS gage.
- Set multimeter to measure 10 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to CKT 321 connector on gage and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates more than 2 volts dc.

Does meter indicate more than 2 volts dc?





YES

NO

15

- **Replace transmission oil pressure gage (page 10-121).**
- **Install basket-indicator panel harness connector (CKT 321) at basket disconnect.**
- **Install transmission shroud (page 9-6).**

TA250333

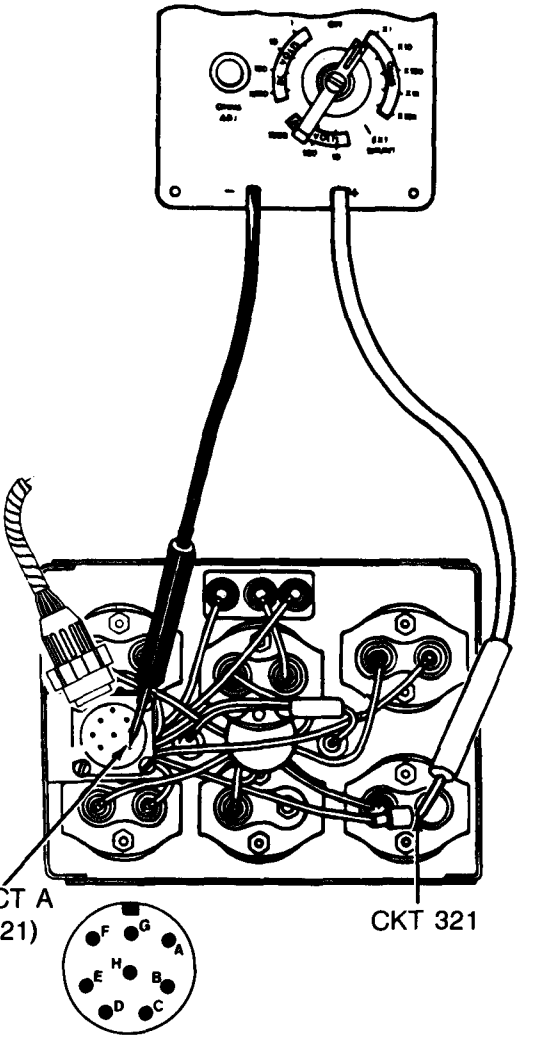
Symptom-34

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

16 **Check gage instrument panel wiring harness (CKT 321) for continuity from connector to TRANSMISSION PRESS indicator gage to contact A of gage instrument panel connector.**

Second Technician (Operator's Station)

- Disconnect basket-indicator panel harness connector from gage instrument panel.
- Set multimeter to OHMS X1 scale and zero meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to gage instrument panel wiring harness connector (CKT 321).
- Connect black probe of meter to contact A (CKT 321) of gage instrument panel connector.



TA250334

Symptom-34

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

STEP 16 CONTINUED

- Check if meter indicates continuity.

Does meter indicate continuity?

YES

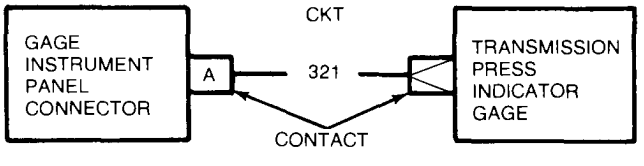
17

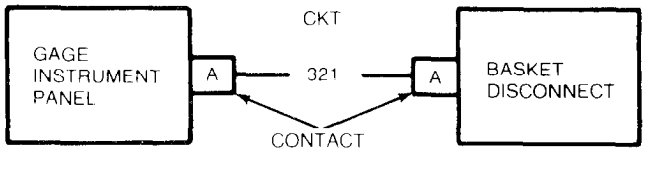
- **Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 321 wire at rear of connectors.**
- **Repair connectors if defective. (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-indicator panel harness.**
- **Connect gage instrument panel harness connector (CKT 321) to TRANSMISSION PRESS indicator gage.**
- **Install basket-indicator panel harness connector (CKT 321) to basket disconnect.**
- **Connect basket-indicator panel harness connector to gage instrument panel.**
- **Install gage instrument panel (page 10-112).**
- **Install transmission shroud (page 9-6).**

NO

18

- **Repair gage instrument panel harness (page 10-298).**
- **Install basket-indicator panel harness connector (CKT 321) to basket disconnects.**
- **Install transmission shroud (page 9-6).**





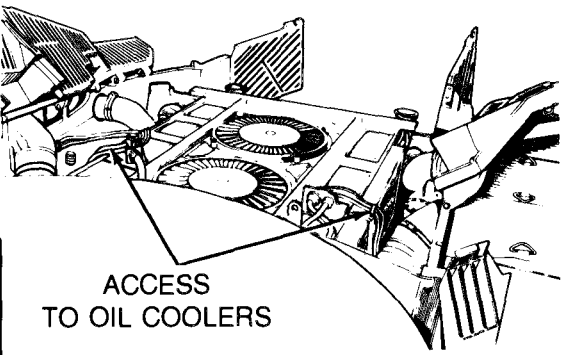
TA250335

Symptom-34
FROM STEP (2)

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

NOTE

Locator views for Step (19) are continued on next page.



ACCESS
TO OIL COOLERS

19 **Check oil coolers for evidence of leaks.**

First Technician (Top Deck)

- Add oil to transmission as required (LO 5-5420-226-12).
- Visually check for evidence of oil leaks around both left and right oil coolers.

Is there evidence of oil leaks around oil coolers?

YES

20

- **Remove powerplant and check transmission components listed below for leaks.**
- **Tighten leaking connections.**
- **If connections are still leaking, repair or replace the following as necessary:**
  - **Left oil cooler (page 6-38).**
  - **Right oil cooler (page 6-38).**
  - **Oil lines and/or connections to left oil cooler (page 6-68).**
  - **Oil lines and/or connections to right oil cooler (page 6-64).**
  - **Connections or gaskets at left and right transmission adapters (page 6-64 and 6-68).**
  - **Main oil filter cover gasket (page 11-89).**
  - **Side oil filter gasket (page 11-96).**

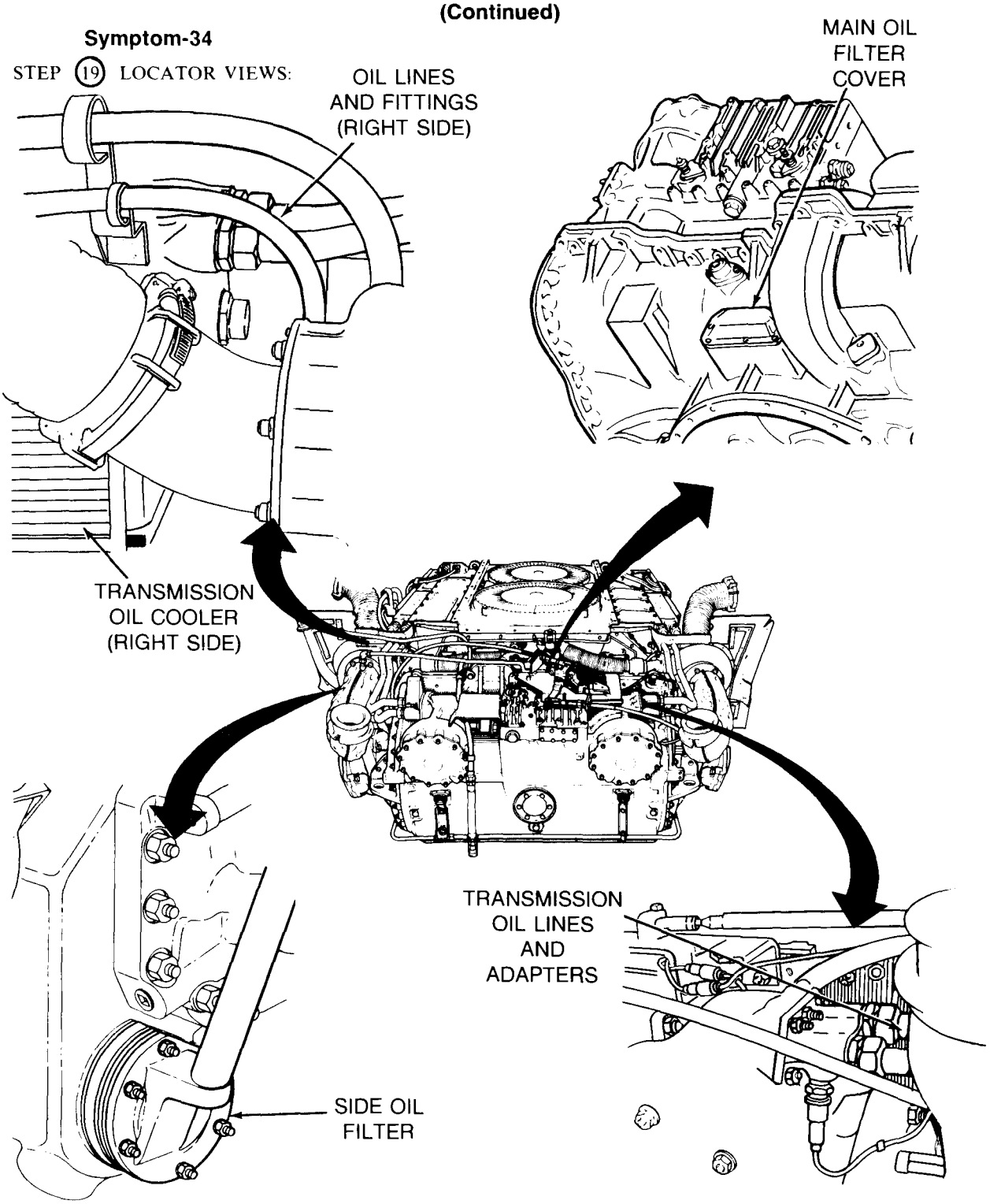
NO

TA250336

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

Symptom-34

STEP (19) LOCATOR VIEWS:



TA250337

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

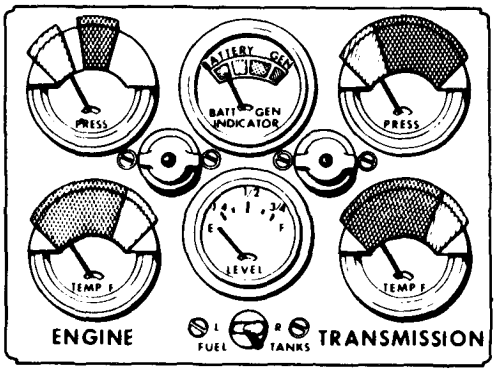
Symptom-34

21 **Check if transmission oil pressure gage indicates pressure.**

Second Technician (Operator's Station)

- Check TRANSMISSION PRESS gage for indication of pressure.
- Stop engine.

Does gage indicate transmission oil pressure?



GAGE INSTRUMENT PANEL

NO

22
- **Check for transmission oil pressure of 4 to 40 psi.**

See Step (4).

YES

23
- **Stop engine.**
- **Problem corrected.**
- **Close top deck grille doors.**

TA250338

Symptom-34
FROM STEP 9

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

24 **Check bulkhead engine disconnect harness (CKT 321) for continuity from connector at engine disconnect to connector at bulkhead disconnect.**

Second Technician (Operator's Station)

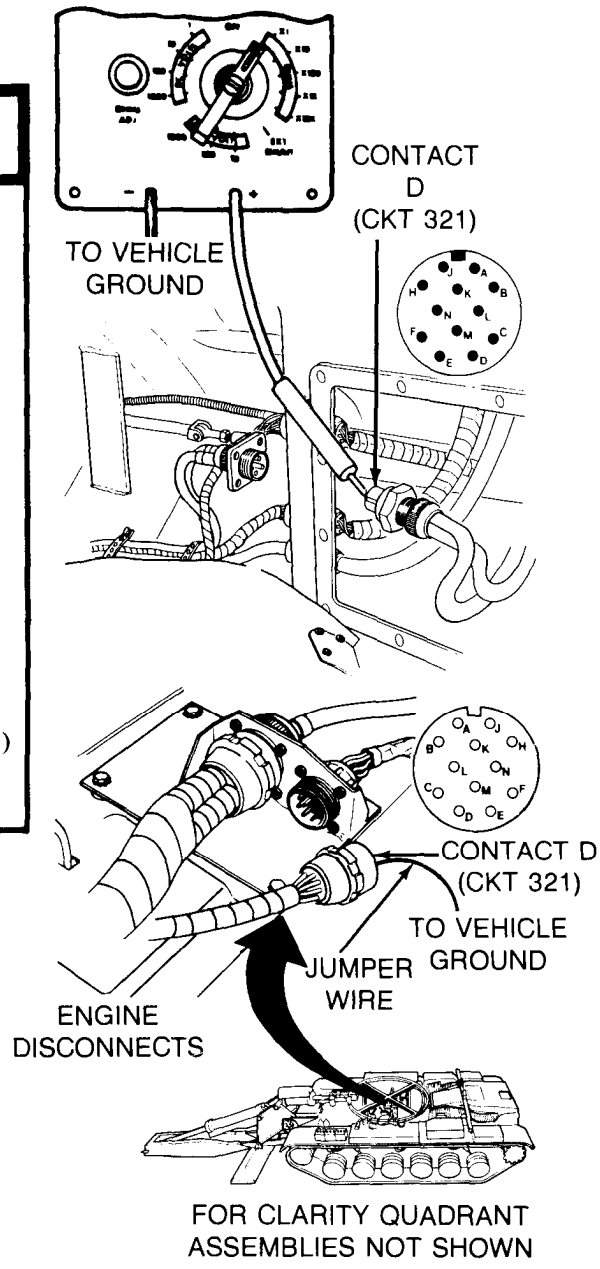
- Set MASTER BATTERY switch OFF.

Second Technician (Top Deck)

- Disconnect bulkhead engine disconnect harness connector (CKT 321) from engine disconnect.
- Connect jumper wire from contact D (CKT 321) of bulkhead engine disconnect harness connector to ground.

First Technician (Commander's Station)

- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact D (CKT 321) of bulkhead engine disconnect harness connector at bulkhead disconnect and black probe to ground.



TA250339

Symptom-34 **DETAILED TROUBLESHOOTING PROCEDURE**
INDICATOR - GAGE
(Continued)

STEP 24 CONTINUED

- Check if meter indicates continuity.

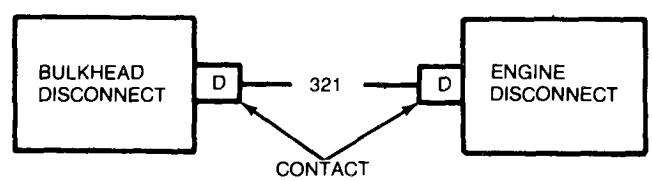
Does meter indicate continuity?

YES

NO

25

- **Inspect bulkhead engine disconnect harness for bent/broken connector contacts or loose CKT 321 wire at rear of connectors.**
- **Repair connectors if defective. (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.**
- **Connect bulkhead engine disconnect harness to engine disconnects.**
- **Install front accessory harness connector (CKT 321) to bulkhead disconnects (page 10-270).**
- **Install transmission shroud (page 9-6).**



TA250340

Symptom-34

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

26 **Check transmission harness (CKT 321) for continuity from connector at transmission disconnect to connector at transmission oil pressure transmitter.**

First Technician (Commander's Station)

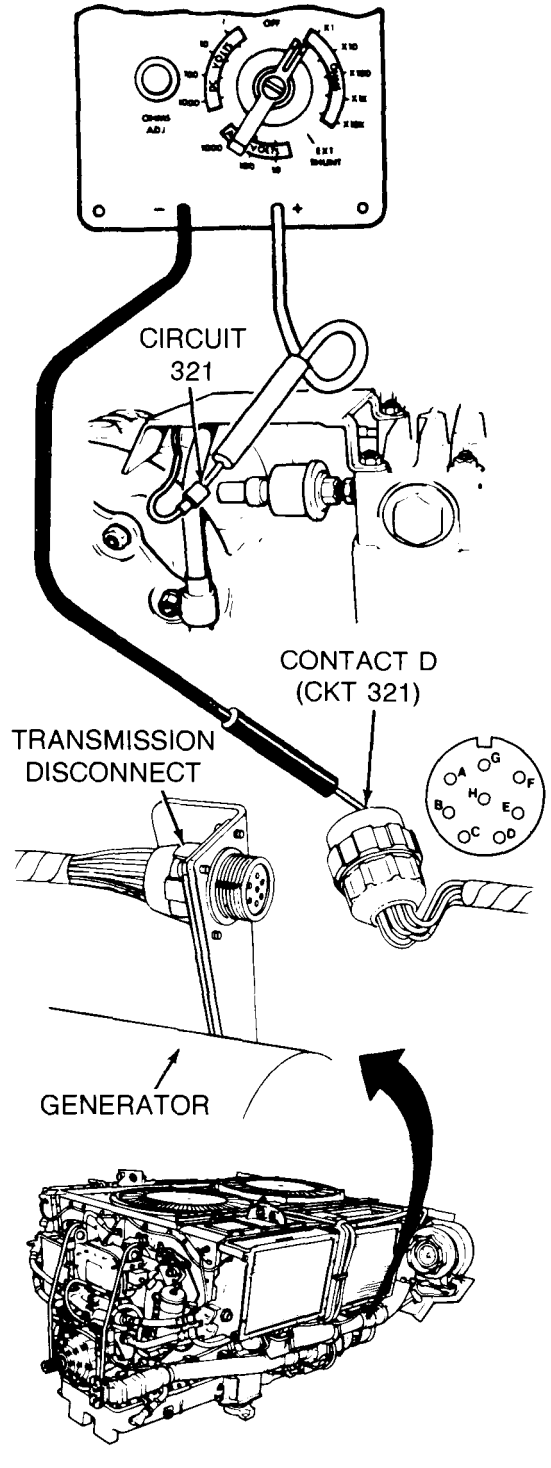
- Install front accessory harness connector at bulkhead disconnect (page 10-270).

First Technician (Rear of Vehicle)

- Have powerplant removed (page 5-2).

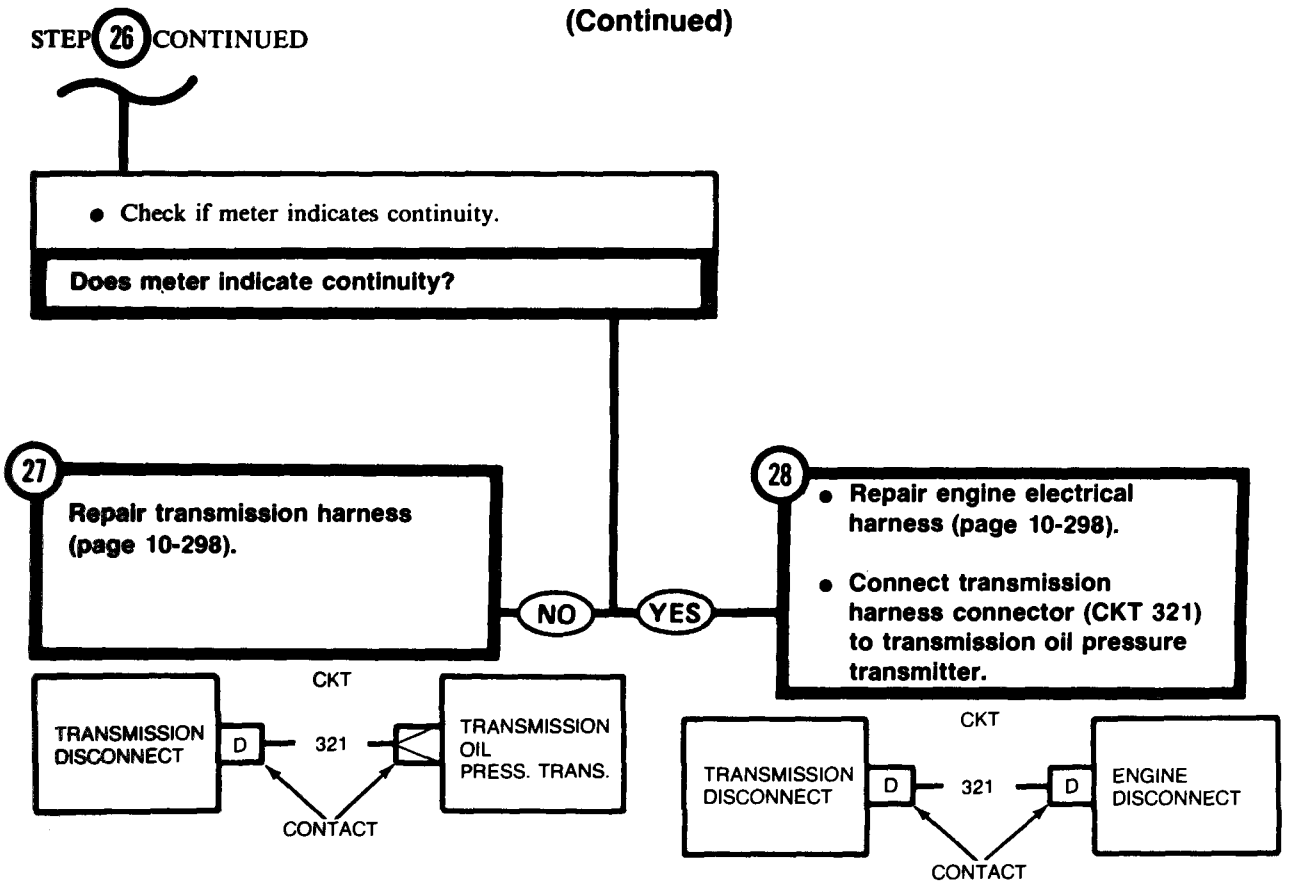
First Technician (Powerplant)

- Disconnect transmission harness connector (CKT 321) from transmission oil pressure transmitter.
- Disconnect transmission harness connector from engine electrical harness connector at transmission disconnect.
- Connect black probe of meter to contact D (CKT 321) of transmission harness connector at transmission disconnect.
- Connect red probe of meter to transmission wiring harness connector (CKT 321) at transmission oil pressure transmitter.



TA250341

Symptom-34 **DETAILED TROUBLESHOOTING PROCEDURE**
INDICATOR - GAGE
(Continued)



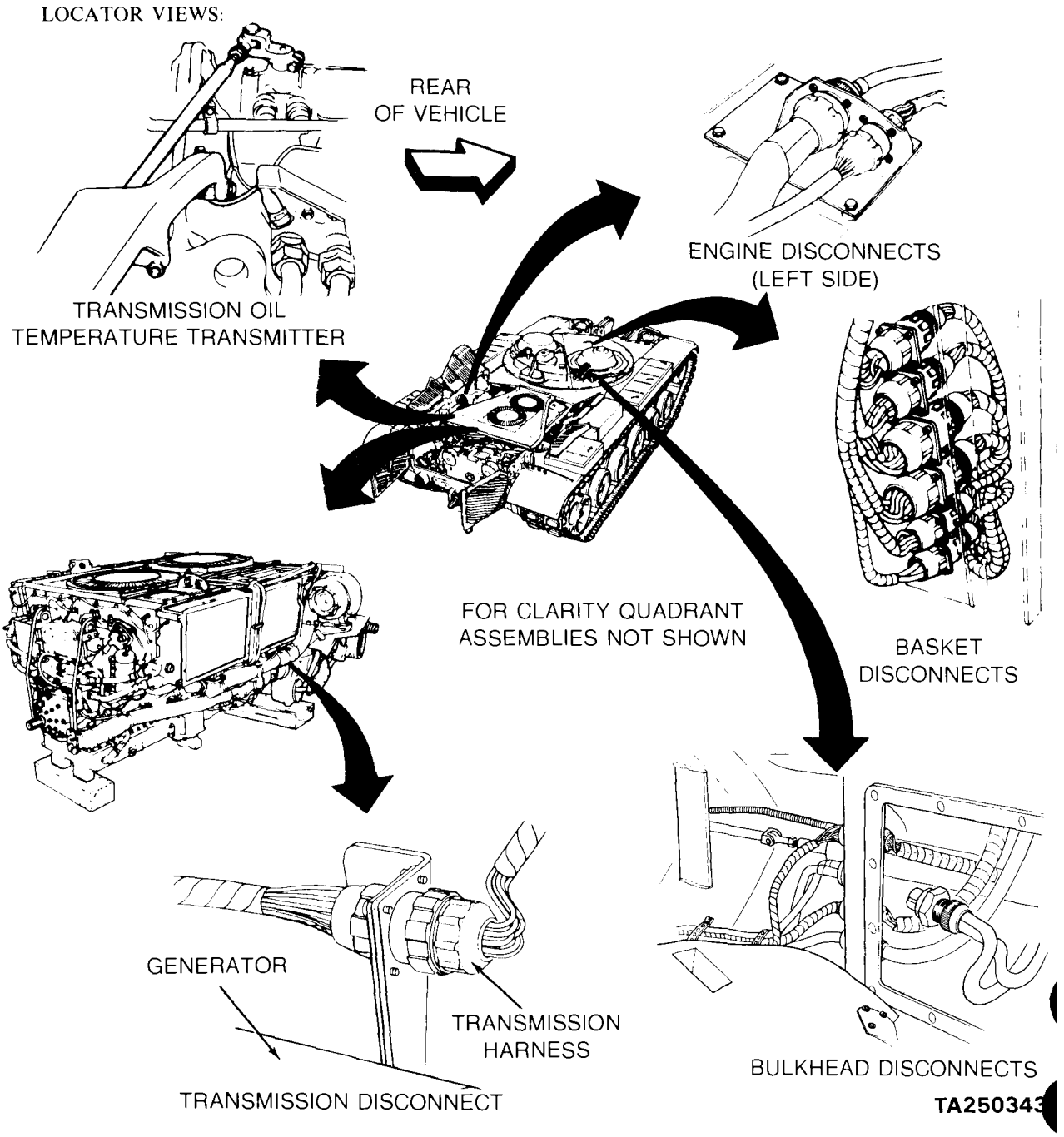
TA250342

Symptom-35

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

TRANSMISSION OIL TEMPERATURE GAGE SHOWS HIGH OR NO TEMPERATURE (POWERPLANT WARNING LAMP NOT ON — ENGINE RUNNING — ALL OTHER GAGES READ NORMAL).

LOCATOR VIEWS:



DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

Symptom-35

TRANSMISSION OIL TEMPERATURE GAGE SHOWS HIGH OR NO TEMPERATURE (POWERPLANT WARNING LAMP NOT ON — ENGINE RUNNING — ALL OTHER GAGES READ NORMAL).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

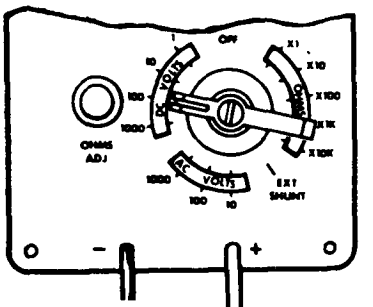
1 Check gage instrument panel harness (CKT 27) at TRANSMISSION TEMP indicator gage for electrical power.

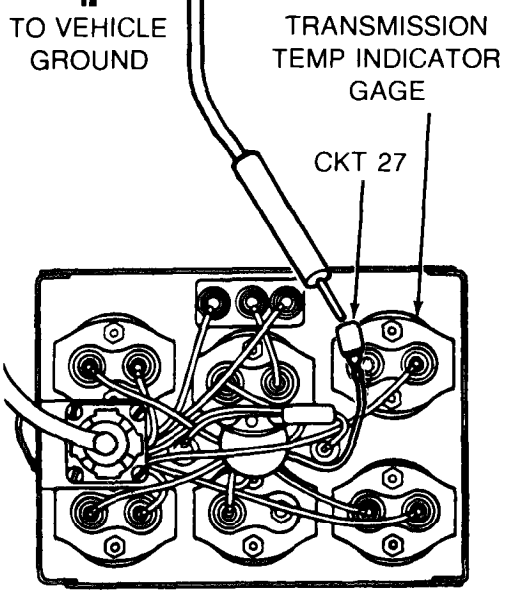
First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace gage instrument panel (page 10-111).
- Disconnect gage instrument panel harness connector (CKT 27) from TRANSMISSION TEMP indicator gage.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to gage instrument panel harness connector (CKT 27) and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

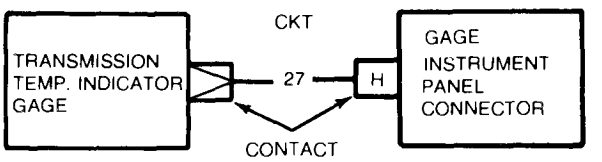
YES — NO





GAGE INSTRUMENT PANEL (REAR VIEW)

2 Repair gage instrument panel harness (CKT 27) (page 10-298).



TA250344

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

Symptom-35

NOTE

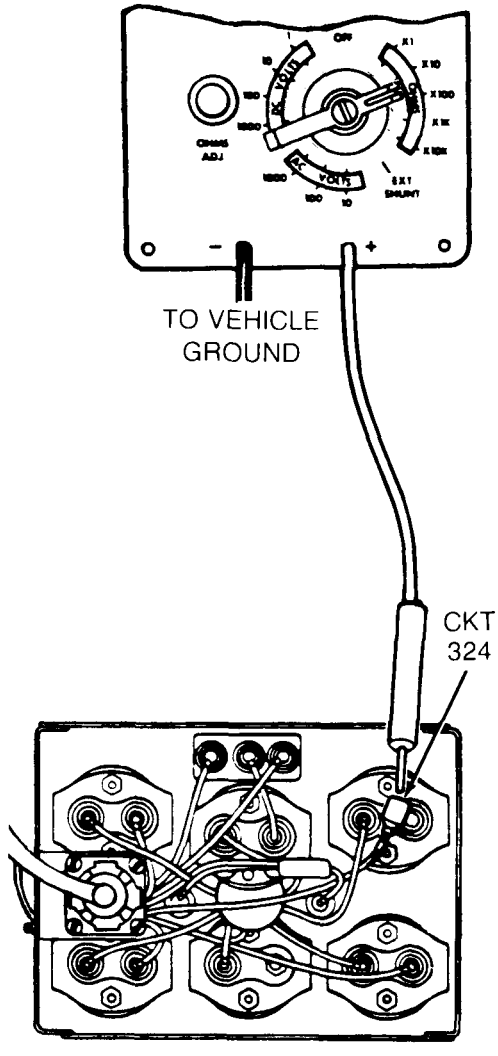
Transmission oil must cool before proceeding.

3 **Check CKT 324 at TRANSMISSION TEMP indicator gage for proper resistance of transmission oil temperature transmitter.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Connect gage instrument panel harness connector (CKT 27) to TRANSMISSION TEMP indicator gage.
- Disconnect gage instrument panel harness connector (CKT 324) from TRANSMISSIÓN TEMP indicator gage.
- Set multimeter to OHMS X100 scale and "zero" meter, or use STE/ICE Test No. 92 (page 4-83).
- Connect red probe of meter to gage instrument panel harness connector (CKT 324) and black probe to ground.
- Check if meter indicates more than 2 000 OHMS or less than 2 000 OHMS.

Does meter indicate more than or less than 2 000 OHMS?



MORE

LESS

4

- **Check transmission oil temperature transmitter for proper resistance.**
- **See Step (10).**

TA250345

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

Symptom-35

5 **Check CKT 324 from TRANSMISSION TEMP indicator gage connector to transmission oil temperature transmitter connector for continuity.**

Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

Second Technician (Rear Grille Doors)

- Disconnect transmission harness connector (CKT 324) from transmission oil temperature transmitter.
- Connect one end of jumper wire to transmission harness connector (CKT 324) and other end of ground.

First Technician (Operator's Station)

- Set multimeter OHMS X1 scale "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to gage instrument panel harness connector (CKT 324) and black probe to ground.
- Check if meter indicates continuity.

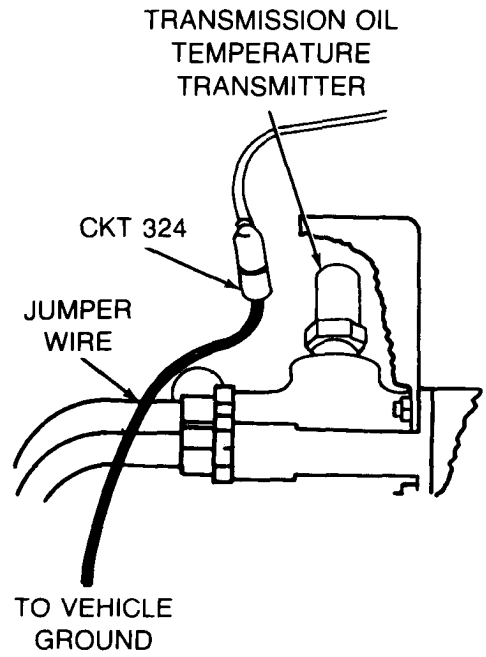
Does meter indicate continuity?

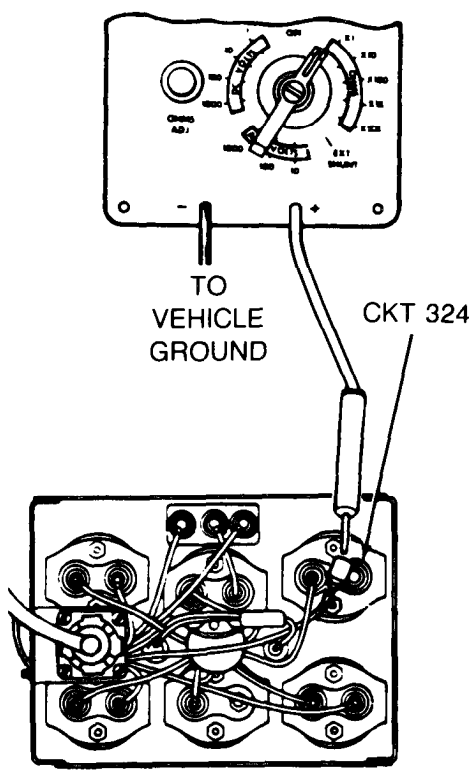
NO

6 **Check gage instrument panel harness (CKT 324) for continuity.**

- **See Step (23).**

YES





TA250346

Symptom-35

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

NOTE

This check is to be performed with transmission completely warmed up.

7 Check transmission oil temperature transmitter for proper resistance.

First Technician (Operator's Station)

- Connect gage instrument panel harness connector (CKT 324) to TRANSMISSION TEMP indicator gage.
- Install gage instrument panel (page 10-112).

Second Technician (Rear Grille Doors)

- Remove jumper wire connected between transmission harness connector (CKT 324) and ground.
- Connect transmission harness connector (CKT 324) to transmission oil temperature transmitter.

Both Technicians (Rear Grille Doors)

- Install transmission shroud (page 9-6).

First Technician (Operator's Station)

- Start engine and allow to warm up completely.
- Drive vehicle in all shift ranges making frequent stops and turns to completely warm up transmission.

TA250347

Symptom-35

STEP (7) CONTINUED

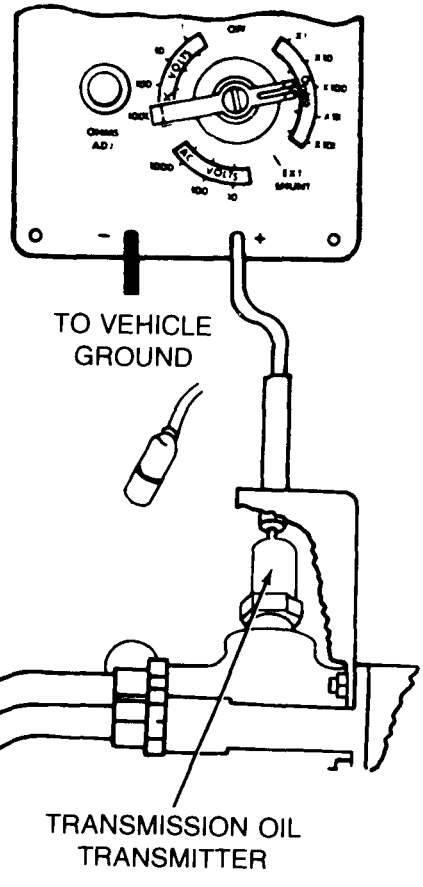
DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

- Stop engine.

Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).
- Disconnect transmission harness connector (CKT 324) from transmission oil temperature transmitter.
- Set multimeter to OHMS X100 scale and "zero" meter, or use STE/ICE Test No. 92 (page 4-83).
- Connect red probe of meter to center contact of transmission oil temperature transmitter and black probe to ground.
- Check if meter indicates less than 2600 OHMS or more than 2600 OHMS.

Does meter indicate less than or more than 2600 OHMS?



MORE

8 **Replace transmission oil temperature transmitter (page 10-234).**

LESS

9

- **Replace TRANSMISSION TEMP indicator gage (page 10-130).**
- **Connect transmission wiring harness connector (CKT 324) to transmission oil temperature transmitter.**
- **Install transmission shroud (page 9-6).**

TA250348

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

Symptom-35

FROM STEP 4

10 **Check transmission oil temperature transmitter for proper resistance.**

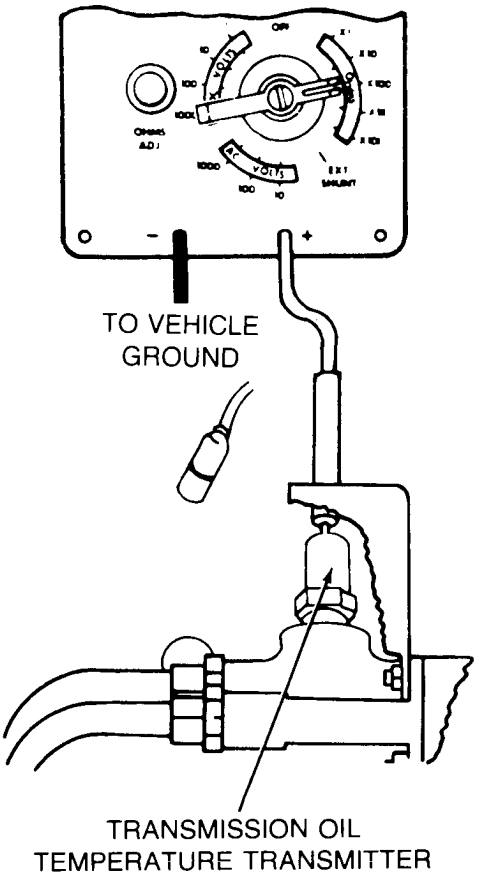
Both Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

First Technician (Rear Grille Doors)

- Disconnect transmission harness connector (CKT 324) from transmission oil temperature transmitter.
- Connect red probe of meter to center contact of transmission oil temperature transmitter and black probe to ground.
- Check if meter indicates more than 2000 OHMS or less than 2000 OHMS.

Does meter indicate more than or less than 2000 OHMS?



MORE

LESS

11

- **Replace transmission oil temperature transmitter (page 10-234).**
- **Reconnect gage instrument panel harness connector (CKT 324) to TRANSMISSION TEMP indicator gage.**
- **Install gage instrument panel (page 10-112).**

TA250349

Symptom-35

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

12 **Check gage instrument panel harness (CKT 324) for short to ground.**

Second Technician (Rear Grille Doors)

- Connect transmission harness connector (CKT 324) to transmission oil temperature transmitter.

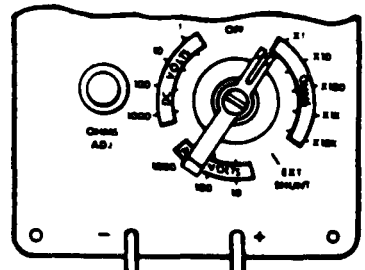
Both Technicians (Rear Grille Doors)

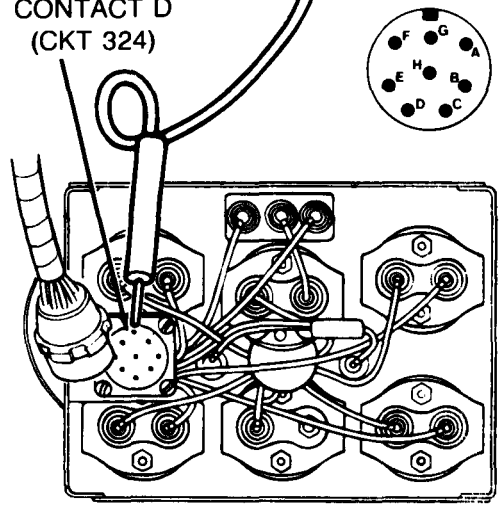
- **Install transmission shroud (page 9-6).**

First Technician (Operator's Station)

- Disconnect basket-indicator panel harness connector from gage instrument panel connector.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to gage instrument panel harness connector contact D (CKT 324) and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short to ground?

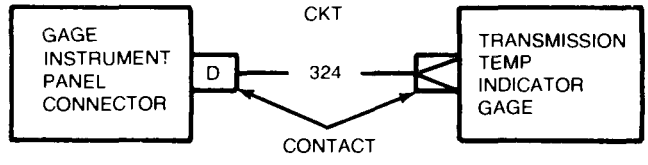




NO

YES

13 **Repair gage instrument panel wiring harness (CKT 324) (page 10-298).**



TA250350

Symptom-35

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

14 **Check basket-indicator panel harness (CKT 324) for short to ground.**

First Technician (Operator's Station)

- Connect gage instrument panel harness (CKT 324) to TRANSMISSION TEMP indicator gage.

Second Technician (Commander's Station)

- Displace basket-indicator panel harness connector from basket disconnect.
- Connect red probe of meter to contact D (CKT 324) of basket-indicator panel harness connector and black probe to ground.
- Check if meter indicates continuity.

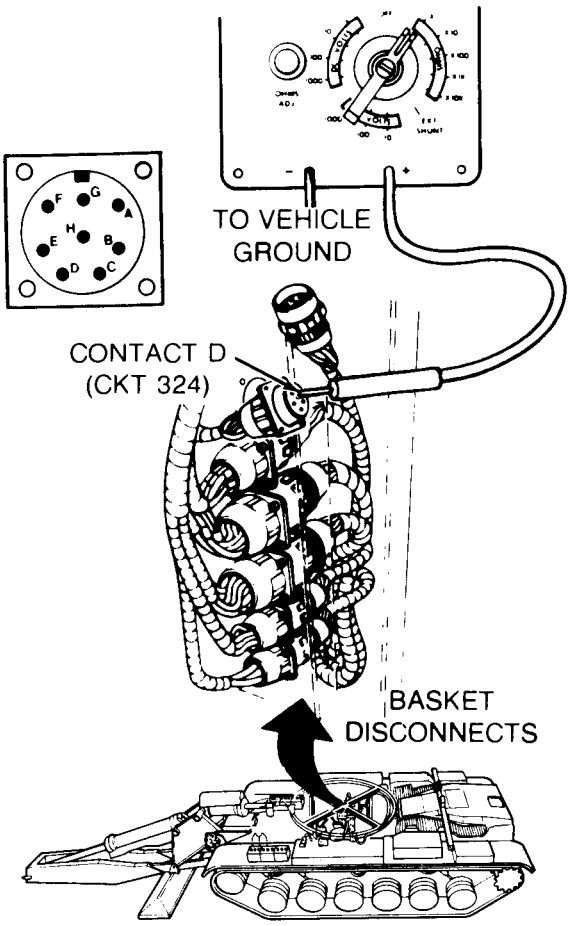
Does meter indicate continuity, thereby indicating a short to ground?

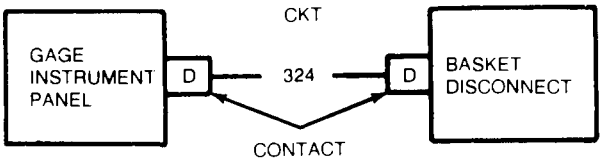
YES

15

- **Inspect basket-indicator panel harness for bent or broken connector contacts or loose CKT 324 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of bad basket-indicator panel harness.**
- **Install basket-indicator panel harness connector at basket disconnect.**
- **Connect basket-indicator panel harness connector to gage instrument panel connector.**
- **Install gage instrument panel (page 10-112).**

NO

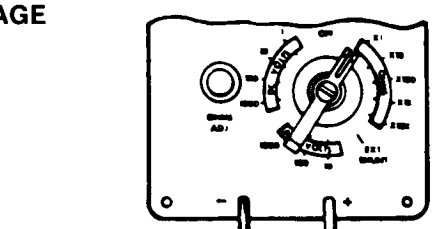


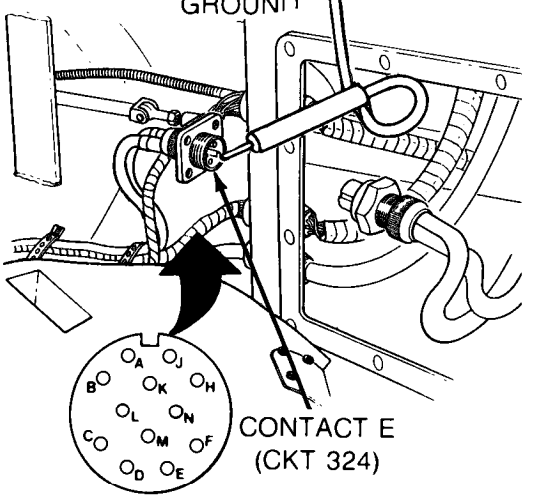


TA250351

Symptom-35

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)





BULKHEAD DISCONNECTS

16 **Check front accessory harness (CKT 324) for short to ground.**

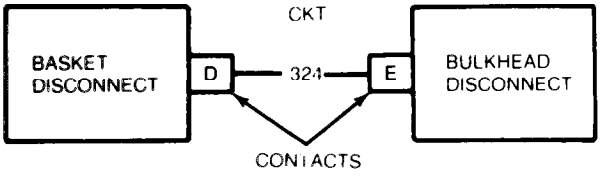
First Technician (Operator's Station)

- Connect basket-indicator panel harness connector to gage instrument panel.
- Install gage instrument panel (page 10-112).

Second Technician (Commander's Station)

- Displace front accessory harness connector from bulkhead disconnects (page 10-269).
- Connect red probe of meter to contact E (CKT 324) of front master harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short to ground?



NO — YES

17

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 324 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Install front accessory harness connector to bulkhead disconnect (page 10-270).**
- **Install front accessory harness connector to basket disconnect.**

TA250352

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

Symptom-35

18 **Check bulkhead engine disconnect harness (CKT 324) for short to ground.**

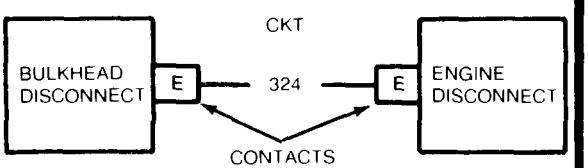
Second Technician (Commander's Station)

- Install basket-indicator panel harness connector at basket disconnects.

First Technician (Left Top Deck Grille Doors)

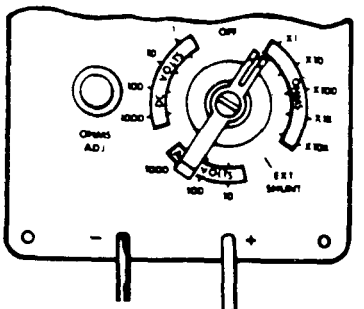
- Open left top deck grille doors to gain access to engine disconnects.
- Disconnect bulkhead engine disconnect harness connector from engine disconnects.
- Connect red probe of meter to contact E (CKT 324) of bulkhead engine disconnect harness connector and black probe to ground.
- Check if meter indicates continuity.

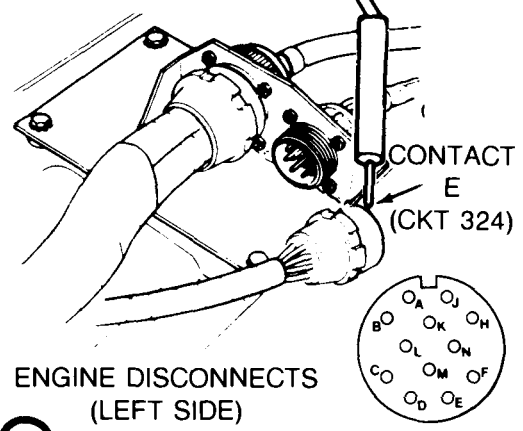
Does meter indicate continuity, thereby indicating a short to ground?



NO

YES





19

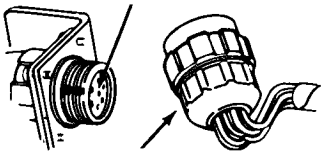
- **Inspect bulkhead engine disconnect harness for bent/ broken connector contacts of loose CKT 324 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.**
- **Connect bulkhead engine disconnect harness to engine disconnect.**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**

TA250353

Symptom-35

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

ENGINE ELECTRICAL WIRING HARNESS CONNECTOR



TRANSMISSION WIRING HARNESS CONNECTOR

20 **Check transmission harness (CKT 324) for short to ground.**

Second Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).

Both Technicians (Rear of Vehicle)

- Have powerplant removed (page 5-2).

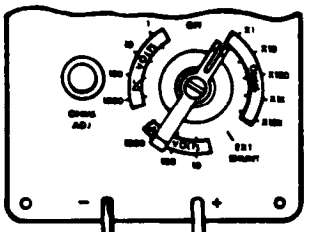
First Technician (Powerplant-Generator Side)

- Disconnect transmission harness connector from transmission disconnect (above generator).

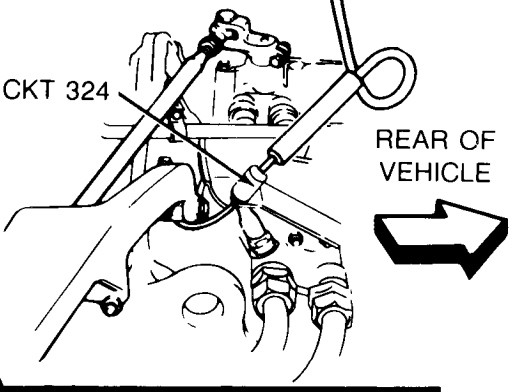
Second Technician (Rear of Powerplant)

- Disconnect transmission harness connector (CKT 324) from transmission oil temperature transmitter.
- Connect red probe of meter to transmission harness connector (CKT 324) and black probe to ground.
- Check if meter indicates continuity.

TRANSMISSION DISCONNECT



TO ENGINE GROUND



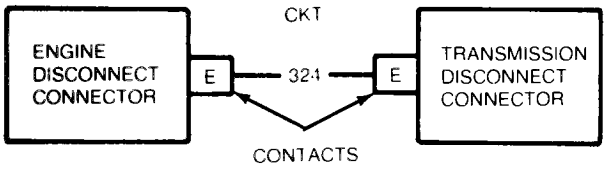
Does meter indicate continuity, thereby indicating a short to ground?

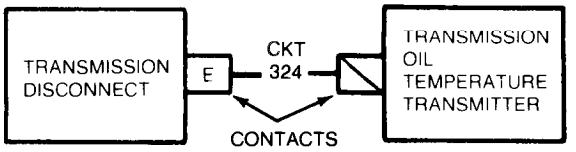
NO

21
- **Repair engine electrical harness (CKT 324) (page 10-298).**
- **Connect transmission harness connector (CKT 324) to transmission oil temperature transmitter.**

YES

22 **Repair transmission harness (CKT 324) (page 10-298).**





TA250354

Symptom-35

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

FROM STEP 6

23 **Check gage instrument panel harness (CKT 324) for continuity.**

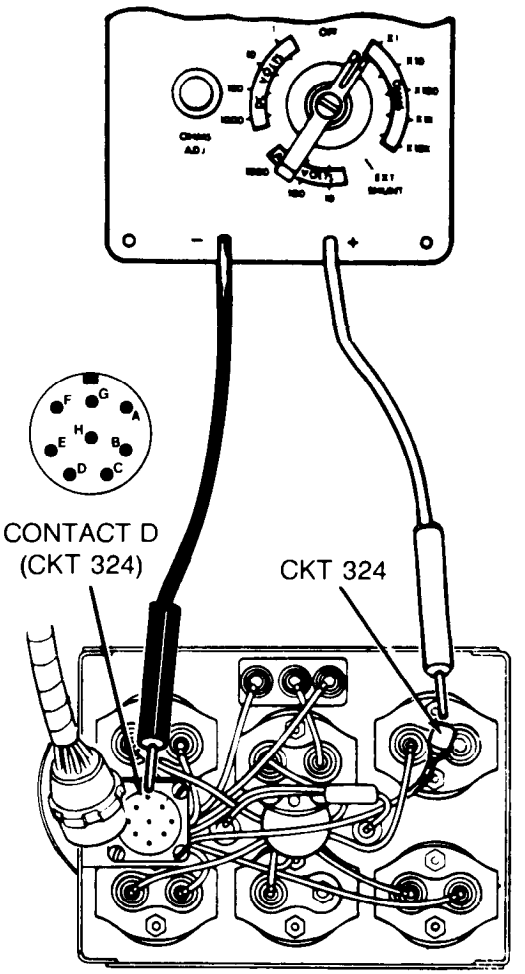
Second Technician (Rear Grille Doors)

- Remove jumper wire connected between transmission harness connector (CKT 324) and ground.
- Connect transmission harness connector (CKT 324) to transmission oil temperature transmitter.

First Technician (Operator's Station)

- Disconnect basket-indicator panel harness connector from gage instrument panel.
- Connect red probe of meter to gage instrument panel harness connector (CKT 324) at TRANSMISSION TEMP indicator gage.
- Connect black probe of meter to contact D (CKT 324) of gage instrument panel connector.
- Check if meter indicates continuity.

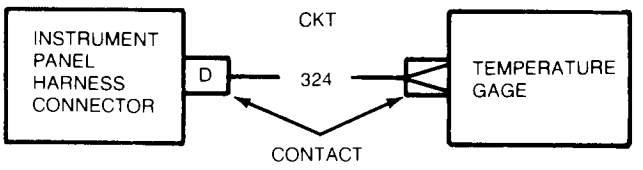
Does meter indicate continuity?



YES

NO

24
- **Repair gage instrument panel harness (CKT 324) (page 10-298).**
- **Install transmission shroud (page 9-6).**



TA250355

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

Symptom-35

25 **Check basket-indicator panel harness (CKT 324) for continuity.**

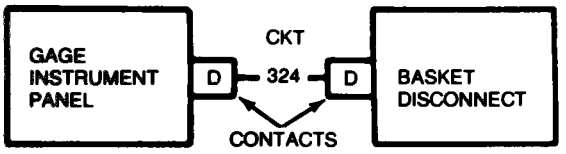
Second Technician (Commander's Station)

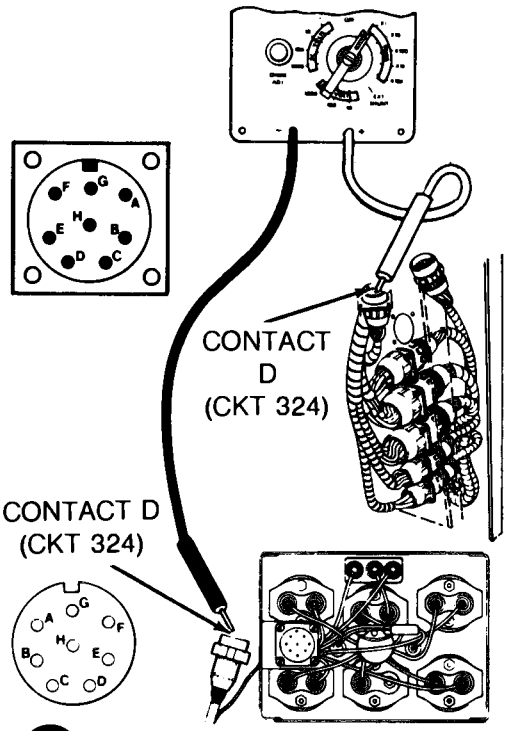
- **Displace basket-indicator panel harness connector (CKT 324) at basket disconnect.**
- Connect red probe of meter to contact D (CKT 324) of basket-indicator panel harness connector at basket disconnect.

First Technician (Operator's Station)

- Connect gage instrument panel harness connector (CKT 324) to TRANSMISSION TEMP indicator gage.
- Connect black probe of meter to contact D (CKT 324) of basket-indicator panel harness connector at gage instrument panel.
- Check if meter indicates continuity.

Does meter indicate continuity?





YES

NO

26

- **Inspect basket-indicator panel harness for bent or broken connector contacts or loose CKT 324 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of bad basket-indicator panel harness.**
- **Install basket-indicator panel harness connector at basket disconnect.**
- **Connect basket-indicator panel harness connector at gage instrument panel.**
- **Install gage instrument panel (page 10-112).**
- **Install transmission shroud (page 9-6).**

TA250356

Symptom-35

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

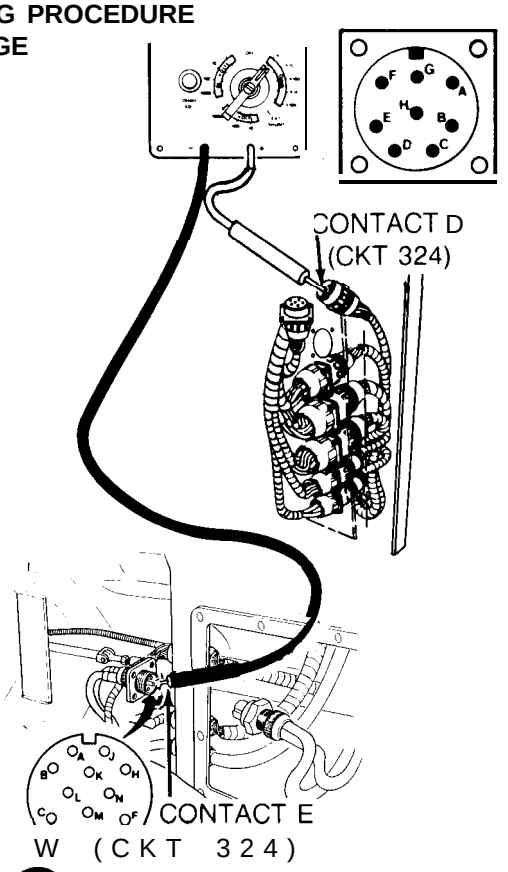
27 **Check front accessory harness (CKT 324) for continuity.**

First Technician (Operator's Station)

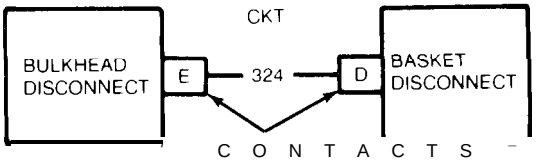
- Connect basket-indicator panel harness connector to gage instrument panel.
- Install gage instrument panel (page 10-112).

Second Technician (Commander's Station)

- Displace front accessory harness connector (CKT 324) from bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact D (CKT 324) of front accessory harness connector at basket disconnect
- Connect black probe of meter to contact E (CKT 324) of front accessory harness connector at bulkhead disconnect.
- Check if meter indicates continuity,



Does meter indicate continuity?



YES

NO

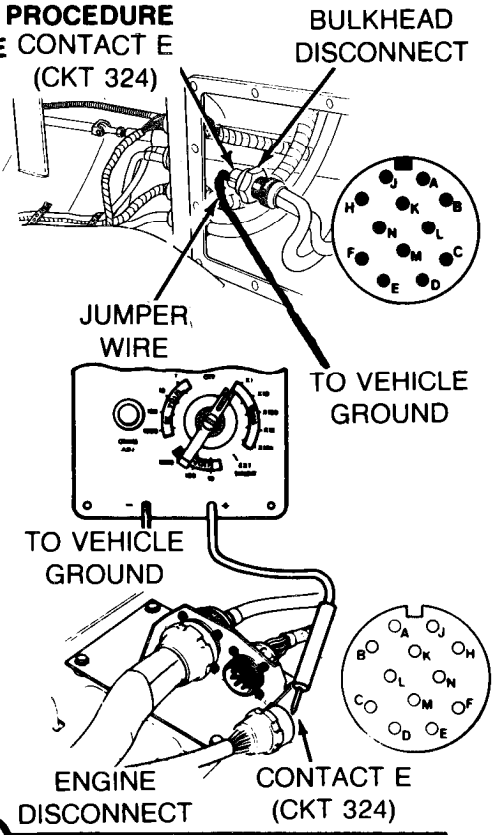
28

- **Inspect accessory harness for bent/broken connector contacts or loose CKT 324 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Install transmission shroud (page 9-6).**
- **Install front accessory harness connector at basket disconnect.**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**

TA250357

Symptom-35

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)



29 **Check bulkhead engine disconnect harness (CKT 324) for continuity.**

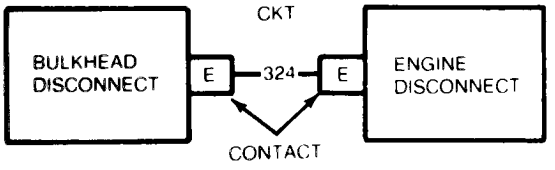
Second Technician (Commander's Station)

- Install basket-indicator panel harness connector at basket disconnect.
- Connect one end of jumper wire to contact E (CKT 324) of bulkhead engine disconnect harness connector at bulkhead disconnect and other end of jumper wire to ground.

Second Technician (Top Deck)

- Open left top deck grille doors to gain access to engine disconnects.
- Disconnect bulkhead engine disconnect harness connector from engine disconnects.
- Connect red probe of meter to contact E (CKT 324) of bulkhead engine disconnect harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?



YES **NO**

30

- **Inspect bulkhead engine disconnect harness for bent/ broken connector contacts or loose CKT 324 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.**
- **Install transmission shroud (page 9-6).**
- **Connect bulkhead engine disconnect harness to engine disconnect.**
- **Install front accessory harness connector at bulkhead disconnect (page 10-298).**

TA250358

Symptom-35

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

31 Check transmission harness (CKT 324) for continuity.

Second Technician (Commander's Station)

- Install front accessory harness connector to bulkhead disconnects (page 10-270).

Both Technicians (Rear of Vehicle)

- Have powerplant removed (page 5-2).

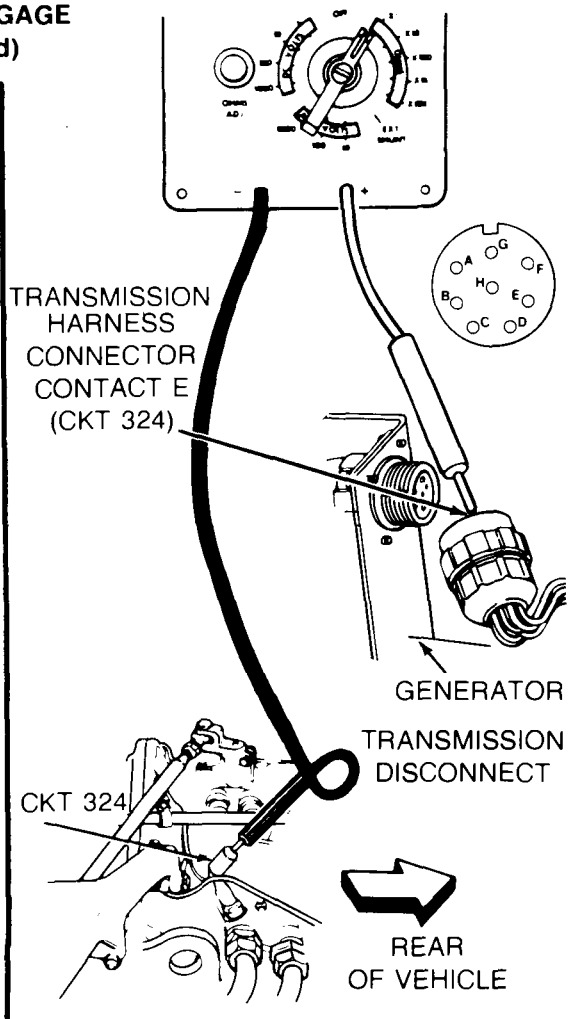
First Technician (Powerplant-Generator Side)

- Disconnect transmission harness connector from transmission disconnect (above generator).

Second Technician (Rear of Engine)

- Disconnect transmission harness connector (CKT 324) from transmission oil temperature transmitter.
- Connect red probe of meter to contact E (CKT 324) of transmission harness connector.
- Connect black probe of meter to transmission harness connector (CKT 324) at transmission oil temperature transmitter.
- Check if meter indicates continuity.

Does meter indicate continuity?



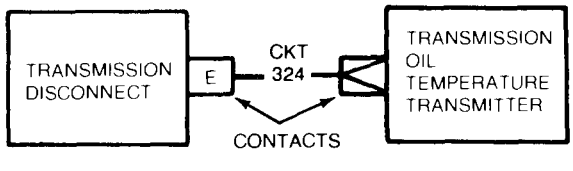
NO

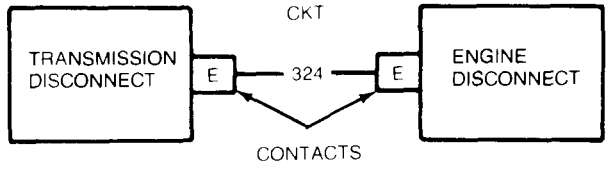
32 Repair transmission harness (CKT 324) (page 10-298).

YES

33

- **Repair engine electrical harness (CKT 324) (page 10-298).**
- **Connect Transmission harness connector (CKT 324) to transmission oil temperature transmitter.**





TA250359

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE

Symptom-36

BATTERY/GENERATOR GAGE WILL NOT WORK (ALL OTHER GAGES WORK).

1 Check for electrical power at BATT GEN INDICATOR input (CKT 27).

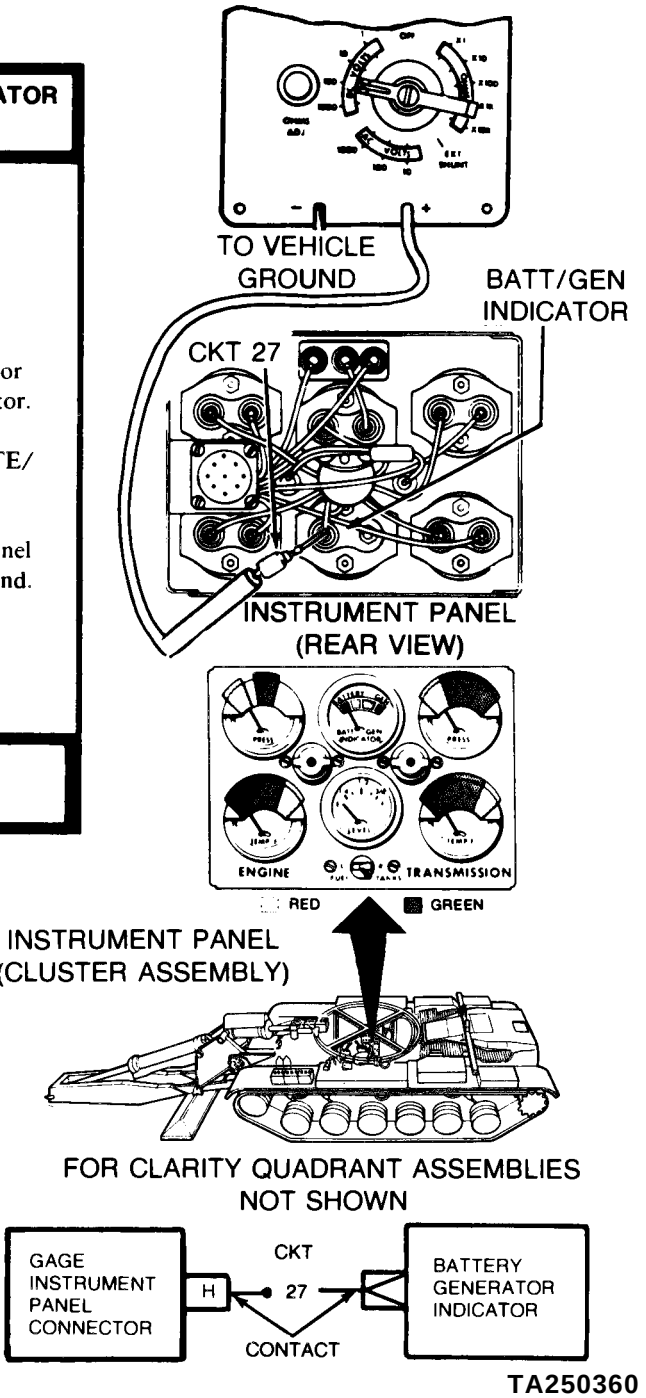
Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace gage instrument panel (page 10-111).
- Disconnect gage instrument panel harness connector (CKT 27) from BATT GEN INDICATOR connector.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to gage instrument panel harness connector (CKT 27) and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

2 Replace gage instrument panel harness (page 10-134). — NO

3 Replace BATT GEN INDICATOR (page 10-119). — YES



TA250360

Symptom-37 DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE

BATTERY/GENERATOR GAGE POINTER IN RIGHT RED AREA.

NOTE

Units with STE/ICE perform Test No. 67, Charging Circuit and Battery Voltage Test. Units without STE/ICE proceed to Step 1 .

1 With engine running, check voltage output at slave receptacle.

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Technician (Commander's Station)

- Set multimeter to measure 25 to 35 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Displace protective cap from slave receptacle.
- Connect red probe of meter to positive (+) socket (CKT 49) of slave receptacle and black probe to ground.

Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Start engine.
- Check if meter indicates 25 to 30 volts dc.
- Stop engine.

Did meter indicate more than 30 volts dc?

ON

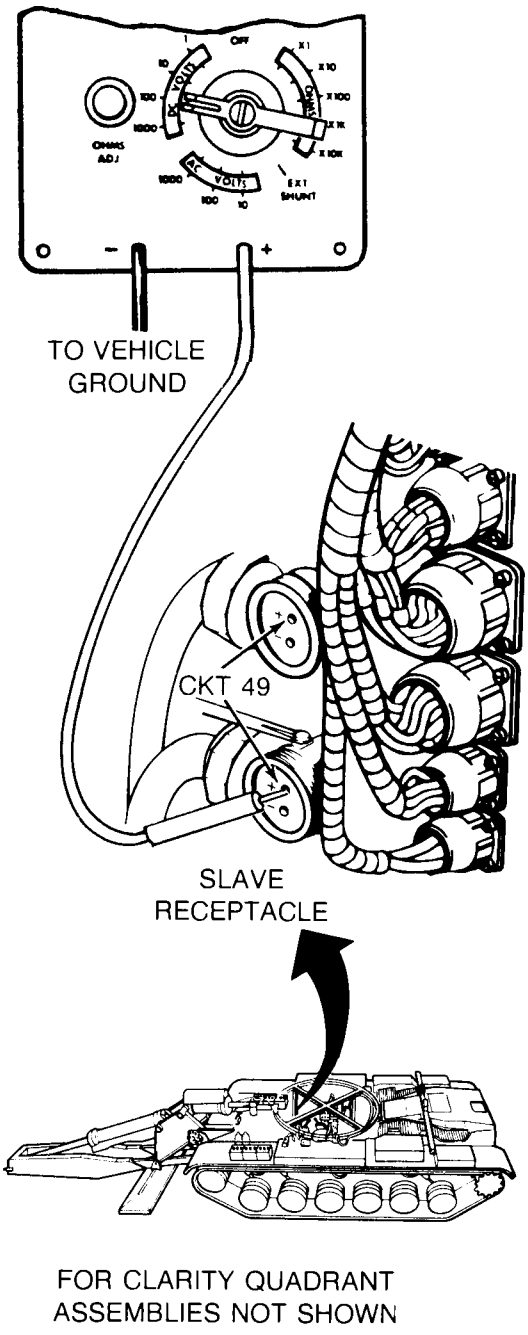
2

- **Replace BATT GEN indicator (page 10-119).**
- **Install protective cap on slave receptacle.**

YES

3

- **Replace voltage regulator (page 10-18).**
- **Install protective cap on slave receptacle.**



TA250361

Symptom-38 **DETAILED TROUBLESHOOTING PROCEDURE**
INDICATOR - GAGES

BATTERY/GENERATOR GAGE POINTER IN YELLOW OR LEFT RED AREA (ENGINE RUNNING).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check for 27 to 30 volts dc at slave receptacle - engine running.

First Technician (Commander's Station)

- Displace protective cap at one slave receptacle.
- Set multimeter to measure 27 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to positive (+) contact (CKT 49) of slave receptacle and black probe to ground.

Second Technician (Operator's Station)

- Start engine.

First Technician (Commander's Station)

- Check if meter indicates 27 to 30 volts dc.

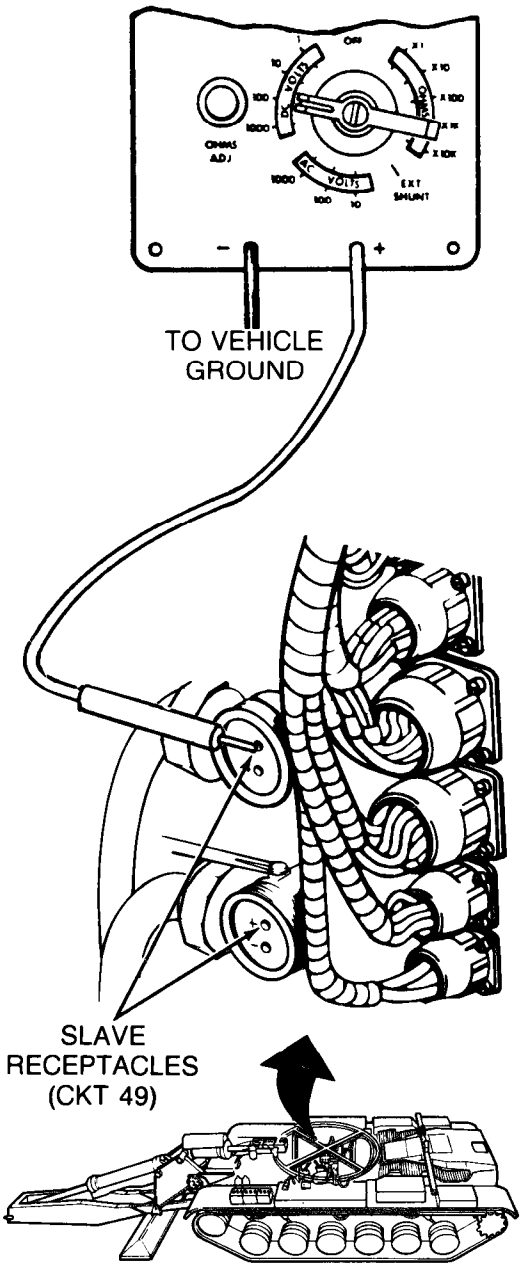
Does meter indicate 27 to 30 volts dc?

2

- **Stop engine and see Symptom 36: BATT/GEN GAGE WILL NOT WORK (ALL OTHER GAGES WORK).**
- **Install protective cap on slave receptacle.**

YES

NO



TA250362

Symptom-38

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGES
(Continued)

3 **Check BATT/GEN gauge pointer position after resetting over voltage circuit breaker on regulator - engine running.**

First Technician (Commander's Station)

- Install protective cap on slave receptacle.
- Remove floor access cover in front of commander's seat (page 17-7).
- Push over-voltage circuit breaker reset pushbutton.

Second Technician (Operator's Station)

- Accelerate engine to 1600 RPM momentarily then reduce engine speed to 700-750 RPM.
- Observe BATT/GEN indicator on instrument panel for generator charging condition.

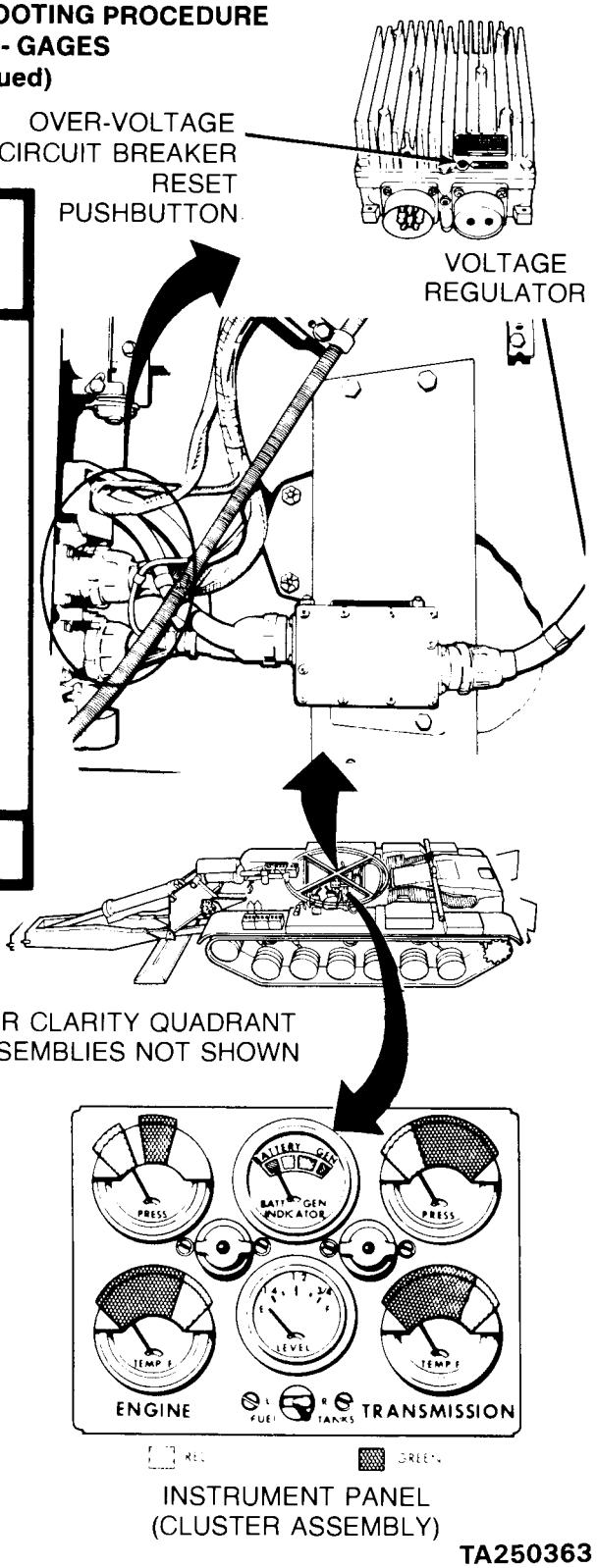
Is BATT/GEN gage pointer in green area?

4
- **Stop engine.**
- **Momentary over-voltage condition corrected.**
- **Install floor access cover (page 17-7).**

YES

5
- **Generator is not charging the batteries.**
- **Stop engine and see Symptom 31: GENERATOR/ REGULATOR SYSTEM IS NOT WORKING.**

NO



INSTRUMENT PANEL (CLUSTER ASSEMBLY)

TA250363

DETAILED TROUBLESHOOTING PROCEDURE

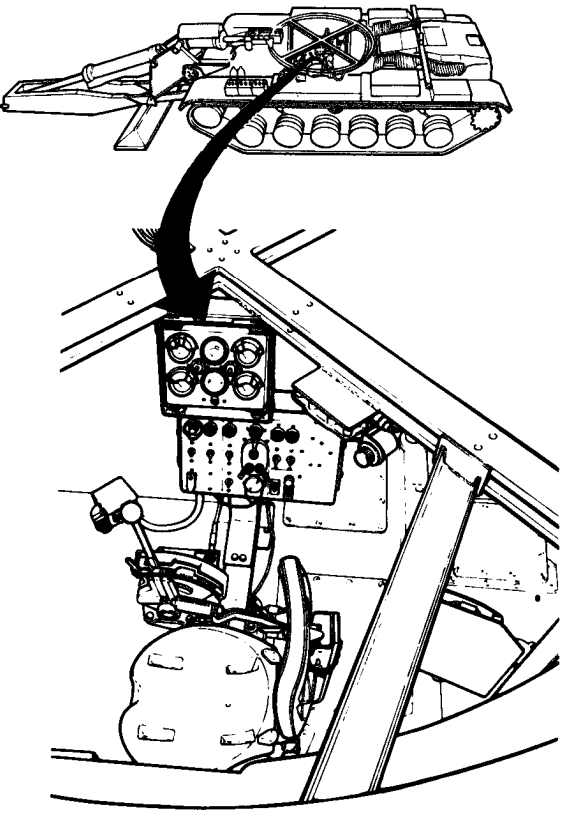
Symptom-39 **INDICATOR - GAGE**

FUEL LEVEL GAGE WILL NOT WORK (ALL OTHER GAGES WORK).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



1 **Check if FUEL TANKS LEVEL indicator gage gives wrong indications for both left (L) and right (R) fuel tank.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set FUEL TANKS selector switch to L.
- Read FUEL TANKS LEVEL indicator gage.
- Set FUEL TANKS selector switch to R.
- Read FUEL TANKS LEVEL indicator gage.

Does FUEL TANKS LEVEL indicator gage give wrong indications for both L and R fuel tanks?

YES **NO**

2

- **Check FUEL TANKS selector switch for continuity through circuit that indicated wrong (CKT 30 for left fuel tank, CKT 31 for right fuel tank).**

- **See Step (10).**

TA250364

Symptom-39

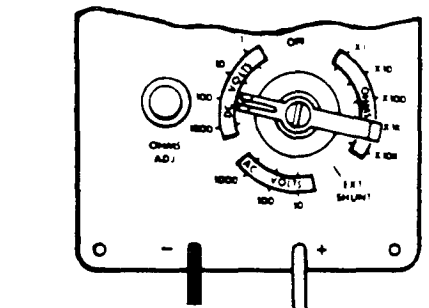
DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

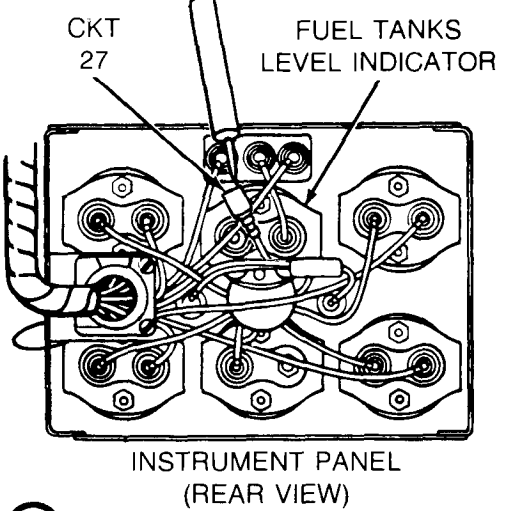
3 **Check gage instrument panel harness connector (CKT 27) at FUEL TANKS LEVEL indicator gage for electrical power.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace gage instrument panel (page 10-111).
- Set meter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Disconnect gage instrument panel harness connector (CKT 27) from FUEL TANKS LEVEL indicator.
- Connect red probe of meter to gage instrument panel harness connector (CKT 27) and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

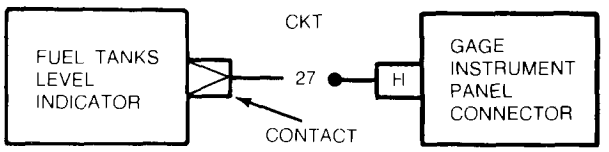




YES

NO

4 **Repair gage instrument panel harness (page 10-298).**



TA250365

Symptom-39

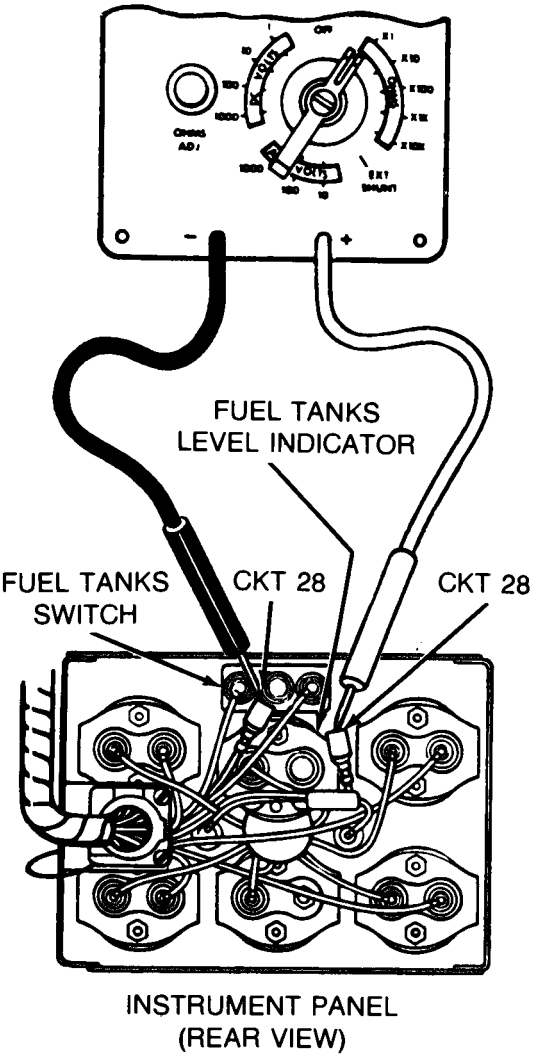
DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

5 **Check fuel tanks selector switch cable (CKT 28) for continuity.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Reconnect gage instrument panel harness connector (CKT 27) to FUEL TANKS LEVEL indicator.
- Set meter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Disconnect fuel tanks selector switch cable (CKT 28) from FUEL TANKS LEVEL indicator and FUEL TANKS selector switch.
- Connect one probe of meter to each end of fuel tanks selector switch cable (CKT 28).
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

NO

6 **Replace fuel tanks selector switch cable (page 10-138).**

TA250366

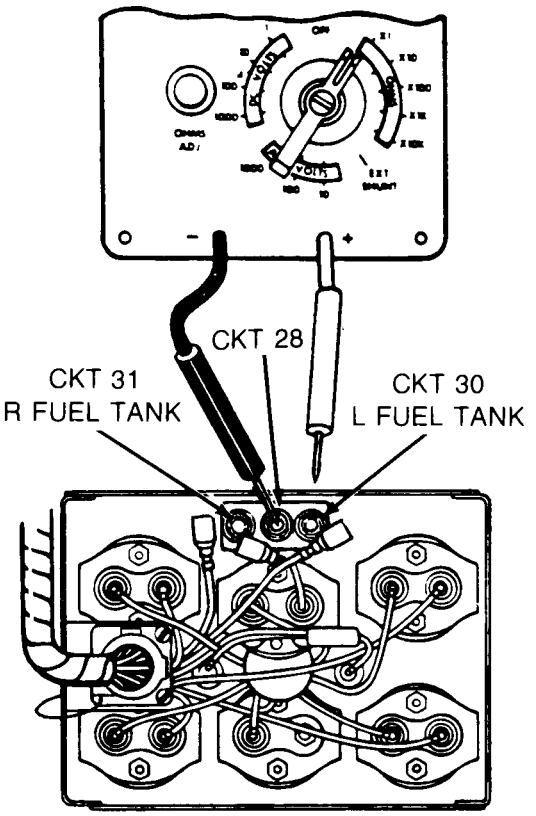
Symptom-39

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

7 **Check FUEL TANKS selector switch for continuity.**

First Technician (Operator's Station)

- Reconnect fuel tanks selector switch cable (CKT 28) to FUEL TANKS LEVEL indicator.
- Connect black probe of meter to center connector of FUEL TANKS selector switch (CKT 28).
- Disconnect either CKT 30 or CKT 31 from FUEL TANKS selector switch.
- Connect red probe of meter to 'gage instrument panel harness connector of circuit disconnected in above step.
- Set FUEL TANKS selector switch to circuit being checked (L for CKT 30, R for CKT 31).
- Check if meter indicates continuity.



Does meter indicate continuity?

NO

8 **Replace FUEL TANKS selector switch (page 10-132).**

YES

9
- **Replace FUEL TANKS LEVEL indicator (page 10-127).**
- **Reconnect CKT 28 and CKT 30 or CKT 31 connectors to FUEL TANKS selector switch.**

T A 2 5 0 3 6 7

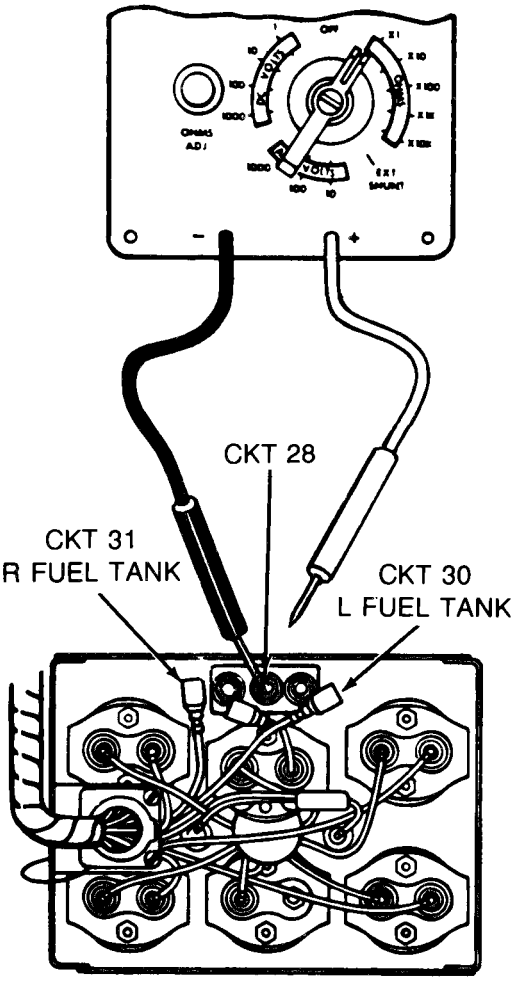
Symptom-39 **DETAILED TROUBLESHOOTING PROCEDURE**
INDICATOR - GAGE
(Continued)

FROM STEP (2)

(10) Check FUEL TANKS selector switch for continuity through circuit that indicated wrong (CKT 30 for left fuel tank, CKT 31 for right fuel tank).

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace gage instrument panel (page 10-111).
- Disconnect fuel tanks selector switch cable (CKT 28) from FUEL TANKS selector switch.
- Set FUEL TANKS selector switch to circuit being checked (L for CKT 30, R for CKT 31).
- Disconnect gage instrument panel harness connector of CKT 30 or CKT 31 (as indicated by fault in Step (1) from FUEL TANKS selector switch.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to gage instrument panel harness connector of circuit disconnected in above step.
- Connect black probe of meter to center connector of FUEL TANKS selector switch.
- Check if meter indicates continuity.



Does meter indicate continuity?

YES

NO

(11) Replace FUEL TANKS selector switch (page 10-132).

TA250368

Symptom-39

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

12 **Check CKT 30 or CKT 31 for continuity from FUEL TANKS selector switch to proper fuel tank liquid quantity transmitter.**

Second Technician (Right or Left Top Deck Grille Doors)

- Open top deck grille doors to gain access to fuel tank liquid quantity transmitter of suspected circuit (left fuel tank for CKT 30, right fuel tank for CKT 31).
- Disconnect rear accessory harness connector from fuel tank liquid quantity transmitter.
- Connect one end of jumper wire to connector disconnected from transmitter and other end to ground.

First Technician (Operator's Station)

- Connect fuel tanks selector switch cable (CKT 28) to FUEL TANKS selector switch.
- Connect red probe of meter to connector of suspected circuit (CKT 30 or CKT 31) at instrument panel and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?

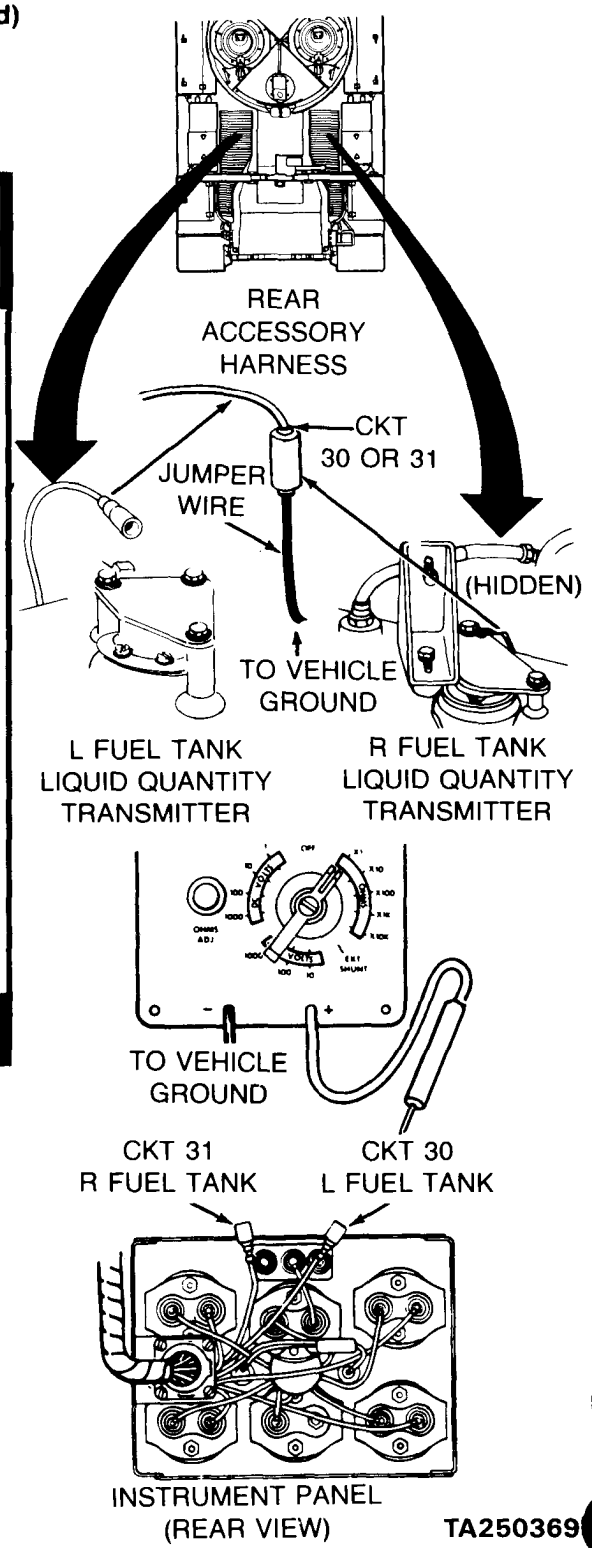
NO

13

- **Check gage instrument panel harness (CKT 30 or CKT 31) for continuity from connector at FUEL TANKS selector switch to gage instrument panel connector.**

- **See Step (23) .**

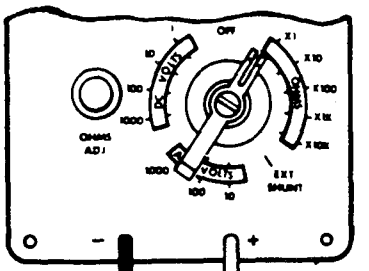
YES



TA250369

Symptom-39

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)



14 **Check CKT 30 or CKT 31 at FUEL TANKS selector switch for short to ground.**

Second Technician (Right or Left Top Deck Grille Doors)

- Remove jumper wire from rear accessory harness connector at fuel tank liquid quantity transmitter.

First Technician (Operator's Station)

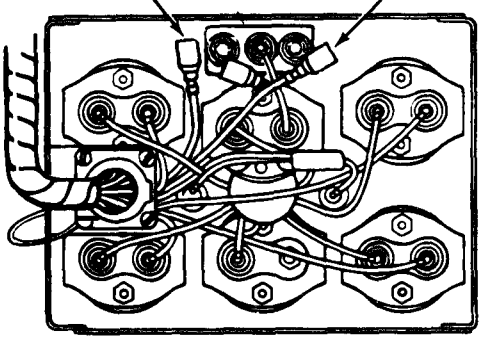
- Connect red probe of meter to connector of suspected circuit (CKT 30 or CKT 31) at instrument panel and black probe to ground.
- Check if meter indicates less than infinite resistance.

Does meter indicate less than infinite resistance, thereby indicating a short?

TO VEHICLE GROUND

CKT 31 R FUEL TANK

CKT 30 L FUEL TANK



YES

NO

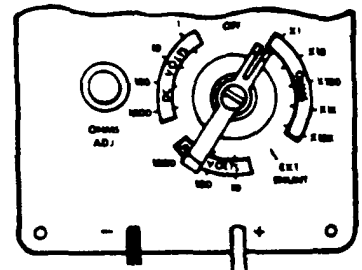
15

- **Replace fuel tank liquid quantity transmitter (page 7-126).**
- **Connect gage instrument panel harness connector (CKT 30 or CKT 31) to FUEL TANKS selector switch.**

TA250370

Symptom-39

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)



16 **Check gage instrument panel harness (CKT 30 or CKT 31) for short to ground.**

First Technician (Operator's Station)

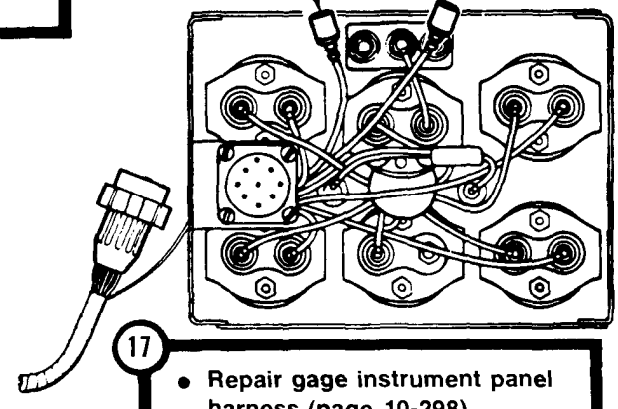
- Disconnect basket-indicator panel harness connector from gage instrument panel.
- Connect red probe of meter to connector of suspected circuit (CKT 30 or CKT 31) at instrument panel and black probe to ground.
- Check if meter indicates less than infinite resistance.

Does meter indicate less than infinite resistance, thereby indicating a short?

TO VEHICLE GROUND

CKT 31 R FUEL TANK

CKT 30 L FUEL TANK

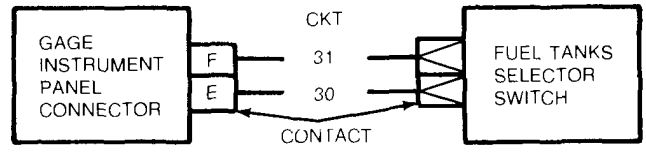


NO

YES

17

- **Repair gage instrument panel harness (page 10-298).**
- **Connect rear accessory harness connector (CKT 30 or CKT 31) to fuel tank liquid quantity transmitter.**



TA250371

Symptom-39

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

18 **Check basket-indicator panel harness (CKT 30 or CKT 31) at basket disconnect for short to ground.**

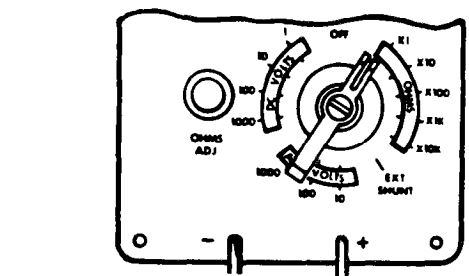
First Technician (Operator's Station)

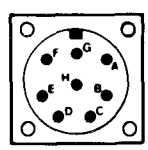
- Connect basket-indicator panel harness connector to gage instrument panel.
- Connect CKT 30 or CKT 31 to FUEL TANKS selector switch.

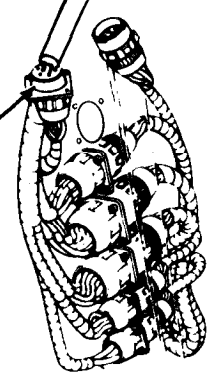
Second Technician (Commander's Station)

- Displace basket-indicator panel harness connector (CKT 30, 31) from basket disconnect.
- Connect red probe of meter to contact of suspected circuit in basket-indicator panel harness connector at basket disconnect (F for CKT 31, E for CKT 30) and black probe to ground.
- Check if meter indicates less than infinite resistance.

Does meter indicate less than infinite resistance, thereby indicating a short?





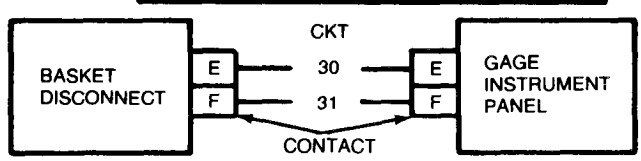


CONTACTS
E (CKT 30)
F (CKT 31)

NO

YES

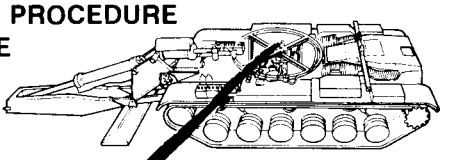
19
- **Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 30 or CKT 31 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket indicator panel harness.**
- **Connect rear accessory harness connectors (CKT 30 or 31) to fuel tank liquid quantity transmitter.**



TA250372

Symptom-39

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

20 **Check front accessory harness (CKT 30 or CKT 31) for short to ground.**

Second Technician (Commander's Station)

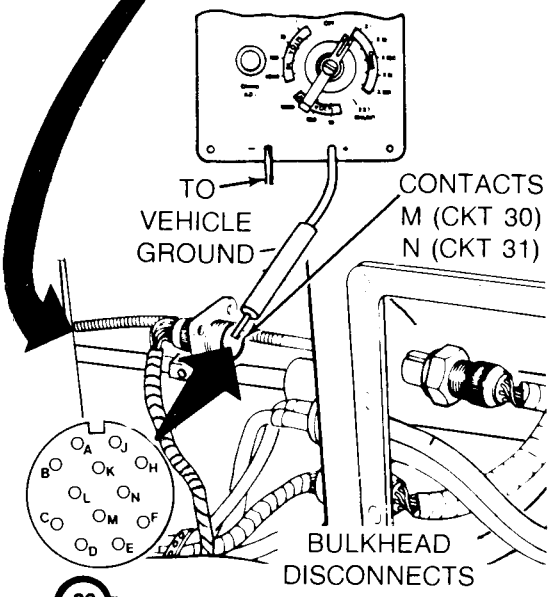
- Install basket-indicator panel harness connector at basket disconnect.

First Technician (Operator's Station)

- Install gage instrument panel (page 10-112).

Second Technician (Commander's Station)

- Displace front accessory harness connector (CKT 30, 31) at bulkhead disconnects (page 10-269).
- Connect red probe of meter to contact of suspected circuit in front accessories harness connector (M for CKT 30, left tank; or N for CKT 31, right tank) and black probe to ground.
- Check if meter indicates less than infinite resistance.



Does meter indicate less than infinite resistance, thereby indicating a short?

NO

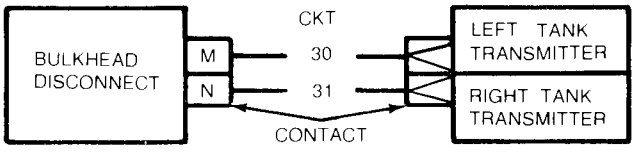
21

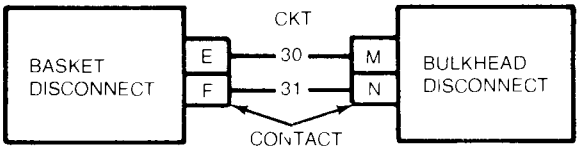
- **Inspect rear accessory harness for bent/broken connector contacts or loose CKT 30 or CKT 31 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective rear accessory to bulkhead harness.**

YES

22

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 30 or CKT 31 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Connect rear accessory harness connector (CKT 30 or 31) to fuel tank liquid quantity transmitter.**





TA250373

Symptom-39 **DETAILED TROUBLESHOOTING PROCEDURE**
INDICATOR - GAGE
(Continued)

FROM STEP 13

23 **Check gage instrument panel harness (CKT 30 or CKT 31) for continuity from connector at FUEL TANKS selector switch to gage instrument panel connector.**

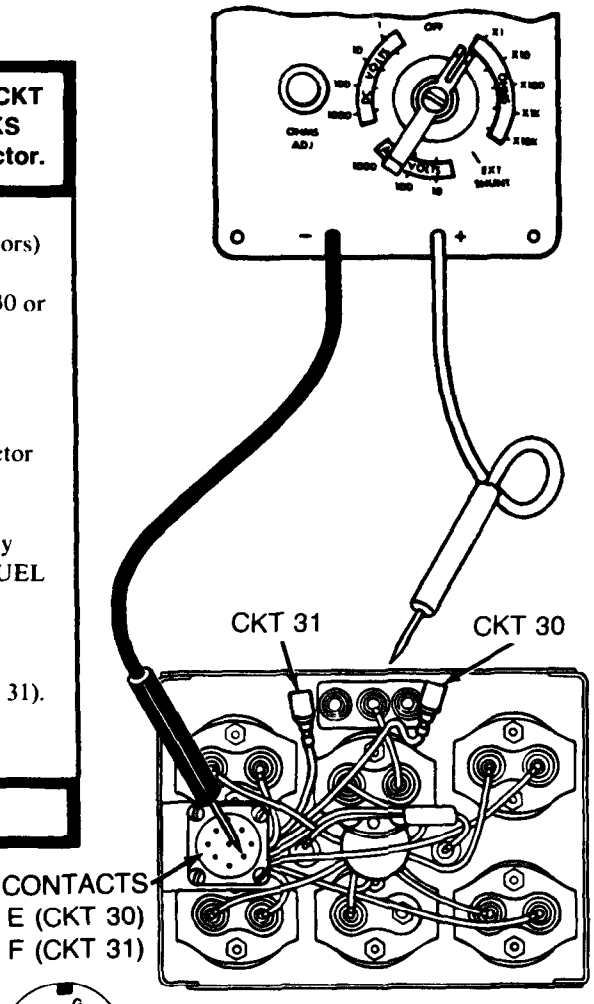
Second Technician (Right or Left Top Deck Grille Doors)

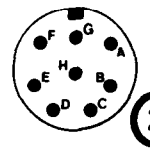
- Connect rear accessory harness connector (CKT 30 or 31) to fuel tank liquid quantity transmitter.

First Technician (Operator's Station)

- Disconnect basket-indicator panel harness connector from gage instrument panel harness connector.
- Connect red probe of meter to connector of faulty circuit (CKT 30 or CKT 31) disconnected from FUEL TANKS selector switch.
- Connect black probe to gage instrument panel connector contact E (CKT 30) or contact F (CKT 31).
- Check if meter indicates continuity.

Does meter indicate continuity?

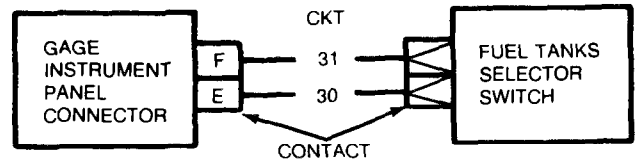




YES

NO

24 **Repair gage instrument panel harness (page 10-298).**



TA250374

Symptom-39

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

25 **Check basket-indicator panel harness (CKT 30 or CKT 31) for continuity from connector at basket disconnect to gage instrument panel connector.**

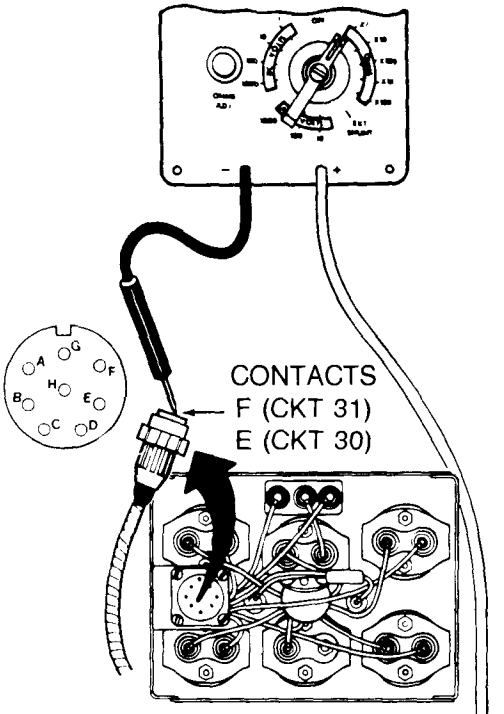
First Technician (Operator's Station)

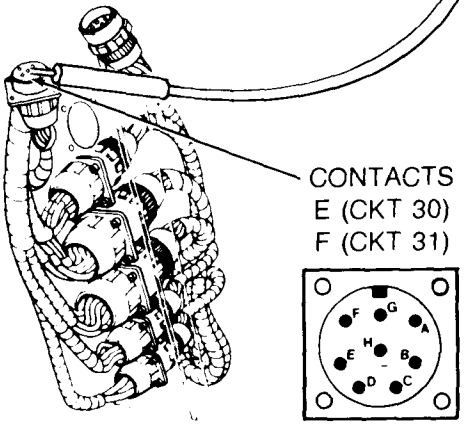
- Connect CKT 30 or CKT 31 to FUEL TANKS selector switch.

Second Technician (Commander's Station)

- Displace basket-indicator panel harness connector (CKT 30, 31) from basket disconnect.
- Connect red probe of meter to contact of faulty circuit (E for CKT 30; F for CKT 31) on basket-indicator panel harness connector at basket disconnect.
- Connect black probe to contact of suspected circuit in basket-indicator panel harness connector at instrument panel (E for CKT 30; F for CKT 31).
- Check if meter indicates continuity.

Does meter indicate continuity?



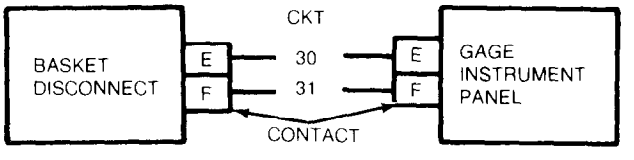


NO

26

- **Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 30 or CKT 31 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-indicator panel harness.**
- **Install basket-indicator panel harness at basket disconnect.**

YES



TA250375

Symptom-39

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

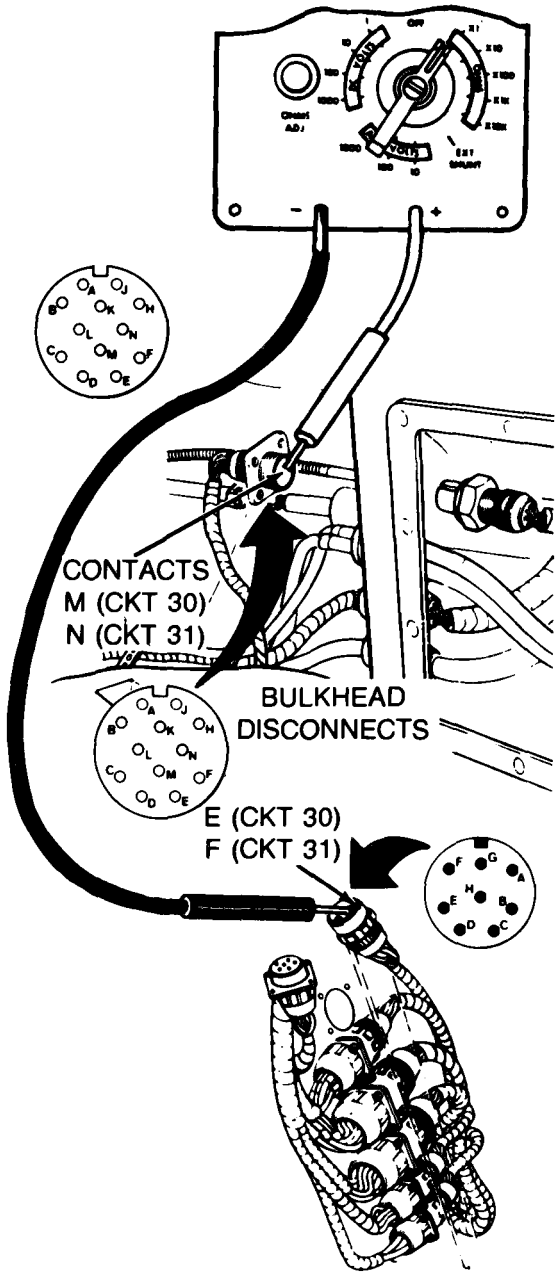
27 **Check front accessory harness (CKT 30 or CKT 31) for continuity from connector at bulkhead disconnect to basket disconnect.**

First Technician (Operator's Station)

- Install gage instrument panel (page 10-112).

Second Technician (Commander's Station)

- Displace front accessory harness connector at bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact of faulty circuit (M for CKT 30; N for CKT 31) in front accessory harness connector at bulkhead electrical disconnect.
- Connect black probe of meter to contact of faulty circuit (E for CKT 30; F for CKT 31) in front accessory harness connector at basket disconnect.



TA250376

Symptom-39 **DETAILED TROUBLESHOOTING PROCEDURE**
INDICATOR - GAGE
(Continued)

STEP (27) CONTINUED

- Check if meter indicates continuity.

Does meter indicate continuity?

NO

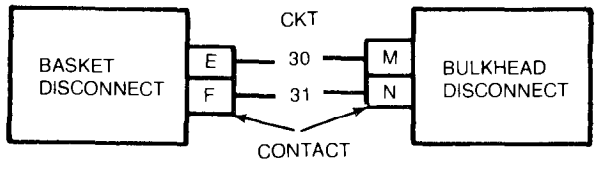
28

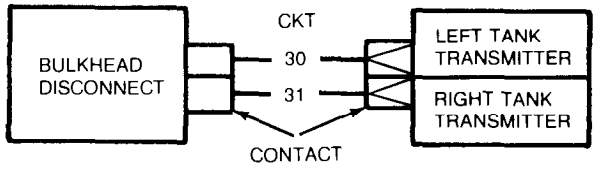
- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 30 or CKT 31 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Install front accessory harness connector at bulkhead disconnects (page 10-270).**

YES

29

- **Inspect rear accessory harness for bent/broken connector contacts or loose CKT 30 or CKT 31 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective rear accessory to bulkhead harness.**
- **Install front accessory harness at bulkhead disconnects (page 10-270).**





TA250377

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE

Symptom-40

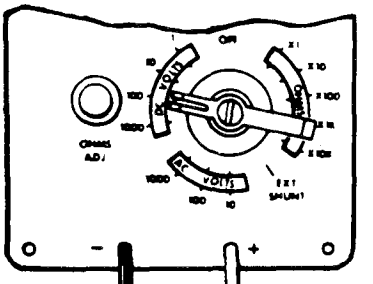
ALL GAGES ON GAGE INSTRUMENT PANEL WILL NOT WORK (ENGINE RUNNING).

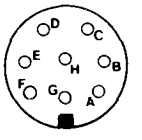
1 Check basket-indicator panel harness connector (CKT 27) at gage instrument panel for electrical power.

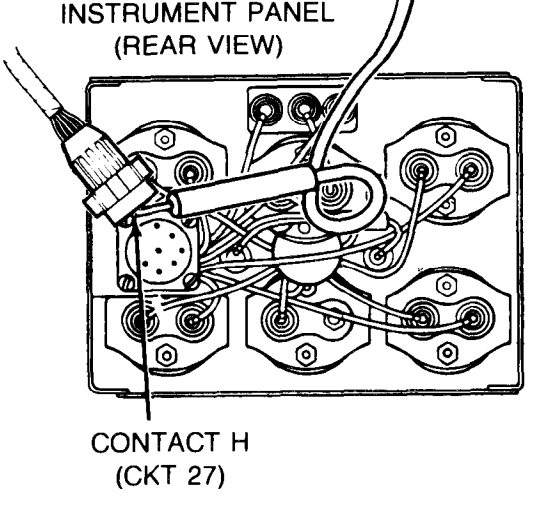
Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace gage instrument panel (page 10-111).
- Disconnect basket-indicator panel harnes connector from gage instrument panel.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact H (CKT 27) of basket-indicator panel harness connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?







NO

YES

2 Repair gage instrument panel harness (page 10-298).

TA250378

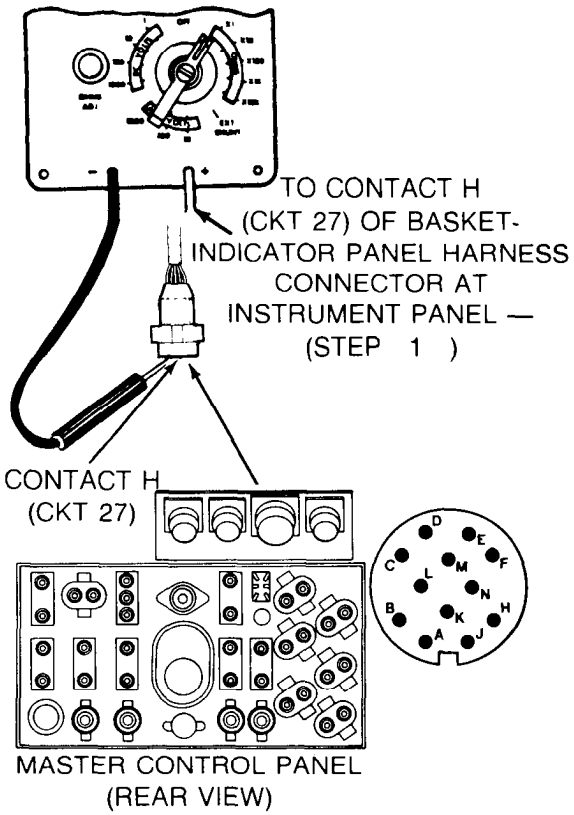
DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

Symptom-40

3 **Check basket-indicator panel harness (CKT 27) for continuity from connector at instrument panel to connector at master control panel.**

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness connector from master control panel.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Check that red probe of meter is still connected to contact H (CKT 27) of basket-indicator panel harness connector at instrument panel (Step 1).
- Connect black probe to contact H (CKT 27) of basket-control panel accessories harness connector.



TA250379

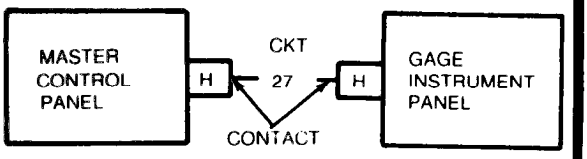
Symptom-40

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

STEP (3) CONTINUED

- Check if meter indicates continuity.

Does meter indicate continuity?



YES

NO

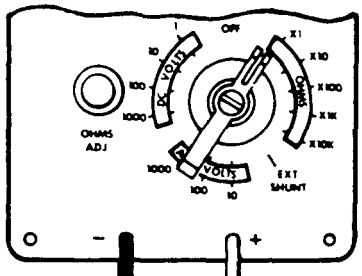
(4)

- **Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 27 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of bad basket-indicator panel harness.**
- **Connect basket-control panel accessories harness connector to master control panel.**
- **Install master control panel (page 10-33).**
- **Connect basket-indicator panel harness connector to gage instrument panel.**
- **Install gage instrument panel (page 10-112).**

TA250380

Symptom-40

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

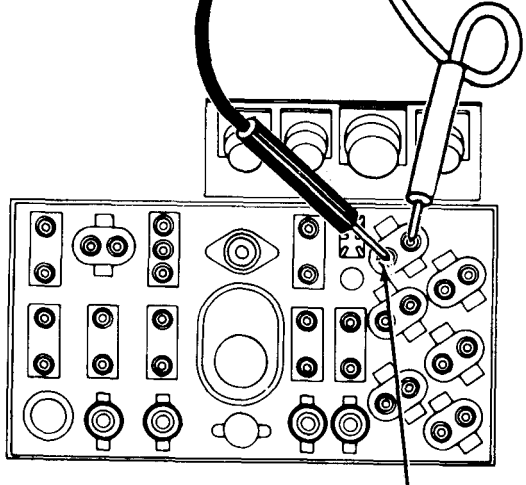


5 **Check gage circuit breaker in master control panel for continuity.**

Technician (Operator's Station)

- Connect basket-indicator panel harness connector to gage instrument panel.
- Install gage instrument panel (page 10-112).
- Remove 4 screws, nuts and washers from master control panel accessories harness connector and displace connector from master control panel.
- Disconnect two electrical leads (CKT 27) from gage circuit breaker on master control panel.
- Connect one meter probe to each circuit breaker contact.
- Check if meter indicates continuity.

Does meter indicate continuity?



GAGE CIRCUIT BREAKER

YES

NO

6
- **Replace gage circuit breaker (page 10-70).**
- **Connect basket-control panel accessories harness connector to master control panel.**

TA250381

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - GAGE
(Continued)

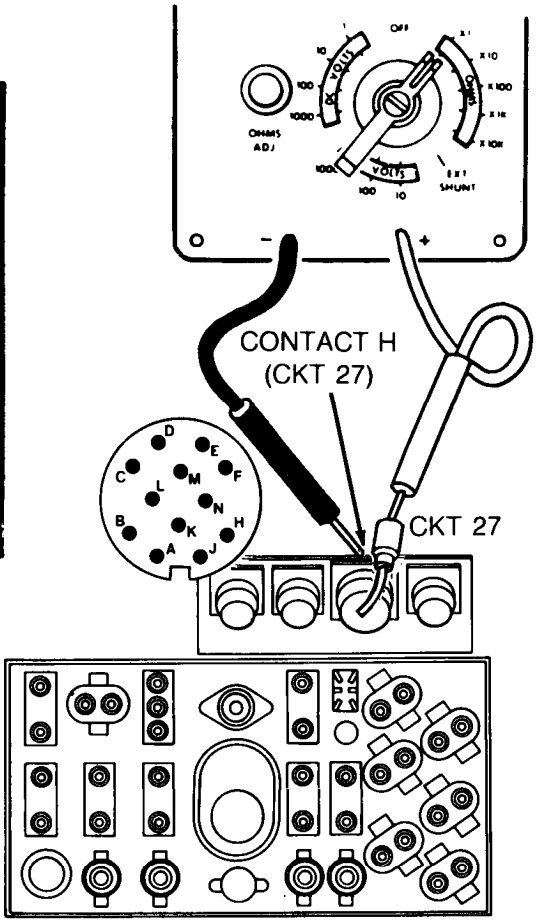
Symptom-40

7 **Check accessories harness (CKT 27) for continuity from panel connector to gage circuit breaker.**

Technician (Operator's Station)

- Connect red probe of meter to accessories harness connector (CKT 27) at gage circuit breaker.
- Connect black probe to contact H (CKT 27) of accessories harness panel connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

8

- **Replace master control panel power harness (page 10-101).**
- **Install control panel accessories harness connector to master control panel.**
- **Connect basket-control panel accessories harness connector to master control panel.**

NO

9 **Replace master control panel accessories harness (page 10-91).**

TA250382

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP

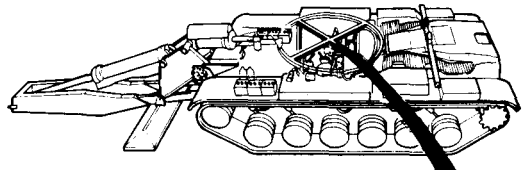
Symptom-41

POWERPLANT WARNING LAMP WILL NOT COME ON (ENGINE NOT RUNNING).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

FOR CLARITY QUANDRANT ASSEMBLIES NOT SHOWN

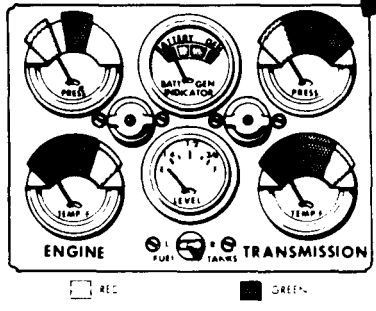


1 Check if indicator gages on gage instrument panel work normally with engine running.

Second Technician (Operator's Station)

- Start engine.
- Check if indicators on gage instrument panel work normally.
- Stop engine.

Do indicator gages work normally with engine running?



INSTRUMENT PANEL

YES

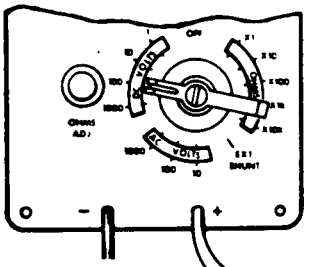
NO

2 See Symptom 40: ALL GAGES ON GAGE INSTRUMENT PANEL WILL NOT WORK (ENGINE RUNNING).

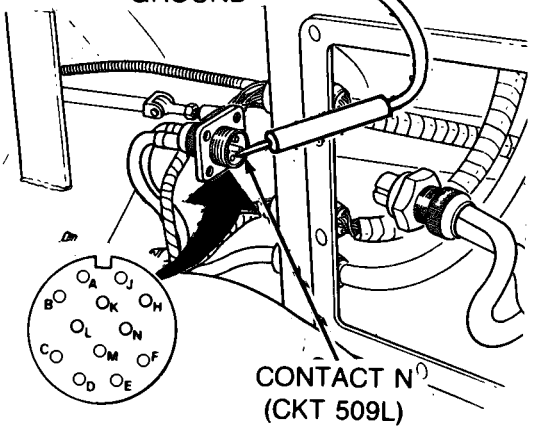
TA250383

Symptom-41

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)



TO VEHICLE GROUND



CONTACT N
(CKT 509L)

3 **Check front accessory harness (CKT 509L) at bulkhead disconnect for electrical power.**

First Technician (Commander's Station)

- Displace front accessory harness connector at bulkhead disconnect (page 10-269).
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. '89 (page 4-81).
- Connect red probe of meter to contact N (CKT 509L) of front accessory harness connector at bulkhead disconnect and black probe to ground.

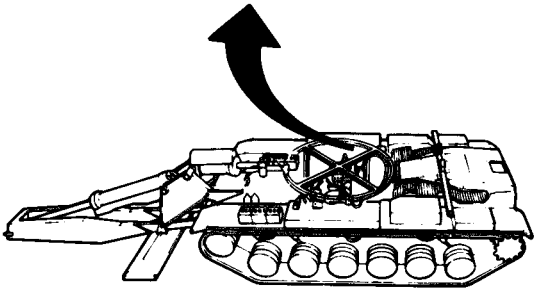
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

YES

NO

4 **Check basket-indicator panel harness (CKT 509L) at basket disconnect for electrical power.**

- **See Step (10).**

TA250384

Symptom-41

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

5 **Check engine electrical harness (CKT 509L) at engine low oil pressure switch for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).
- Remove lower engine access cover (page 17-13).
- Disconnect engine electrical harness connector (CKT 509L) from engine low oil pressure switch.
- Connect red probe of meter to center contact of engine electrical harness connector and black probe to ground.

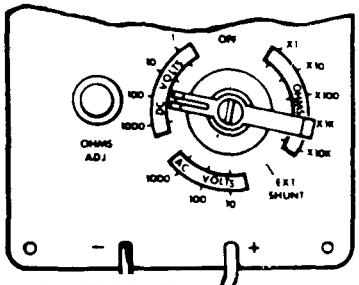
Second Technician (Operator's Station)

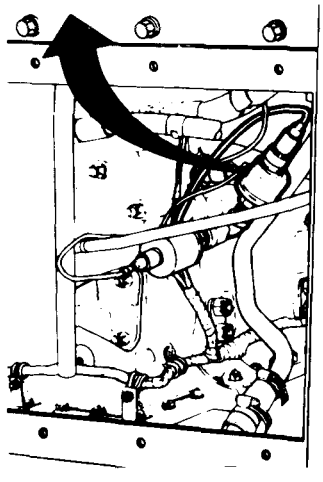
- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

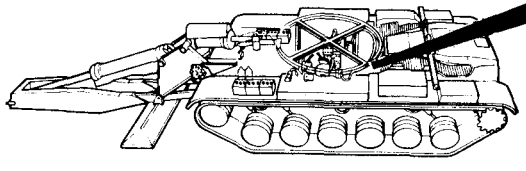
Does meter indicate 18 to 30 volts dc.?





LOWER ENGINE ACCESS PANEL

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



NO

YES

6 **Replace engine low oil pressure switch (page 10-242).**

TA250385

Symptom-41

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

7 **Check engine accessory control hanress (CKT 509L) at engine disconnect for electrical power.**

First Technician (Rear of Crew Compartment)

- Reconnect engine electrical harness connector (CKT 509L) to engine low oil pressure switch.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Left Top Deck Grille Doors)

- Open left top deck grille doors.
- Disconnect bulkhead engine disconnect harness connector (CKT 509L) at engine disconnect.
- Connect red probe of meter to contact N (CKT 509L) of bulkhead engine disconnect harness connector and black probe to ground.

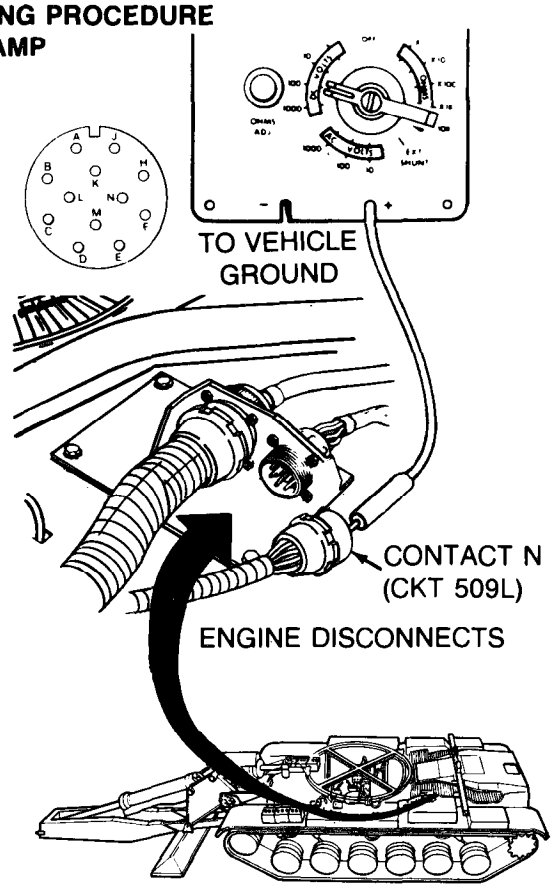
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Left Top Deck Grille Doors)

- Check if meter indicates 18 to 30 volts dc?

Does meter indicate 18 to 30 volts dc?



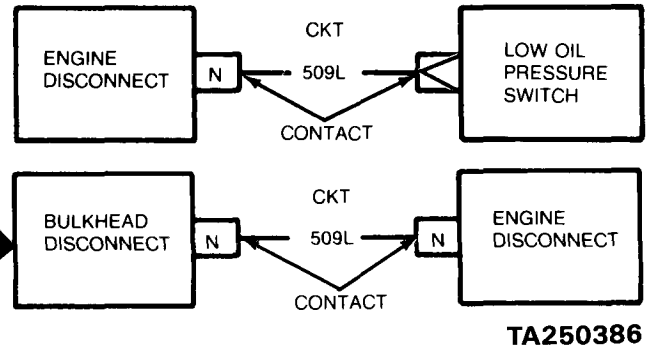
8

- **Inspect bulkhead engine disconnect harness for bent/ broken connector contacts or loose CKT 509L wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.**
- **Connect bulkhead engine disconnect harness connector at engine disconnect.**

NO

YES

9 **Repair engine electrical harness (CKT 509L) (page 10-298).**



TA250386

Symptom-41 **DETAILED TROUBLESHOOTING PROCEDURE**
INDICATOR - LAMP
(Continued)

FROM STEP 4

10 **Check basket-indicator panel harness (CKT 509L) at basket disconnect for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Reinstall front accessory harness connector at bulkhead disconnect (page 10-270).
- Displace basket-indicator panel harness connector (CKT 509L) at basket disconnect.
- Connect red proble of meter to contact H (CKT 509L) of basket-indicator panel harness connector and black probe to ground.

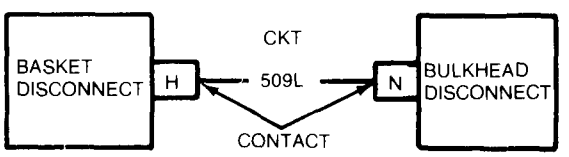
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

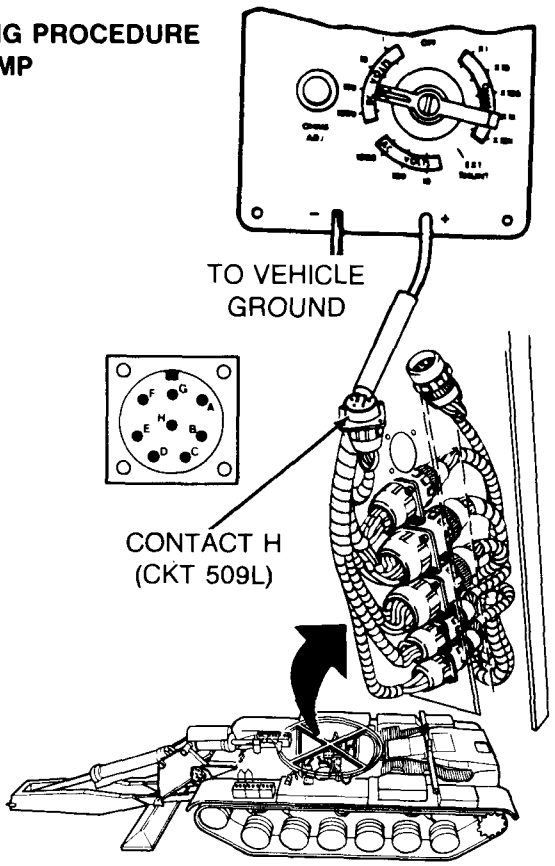
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



NO

YES



11

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 509L wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Install basket-indicator panel harness connector at basket disconnect.**

TA250387

Symptom- 41

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

12 **Check POWERPLANT WARNING LAMP for continuity.**

Second Technician's (Operator's Station)

- Set MASTER BATTERY switch OFF.

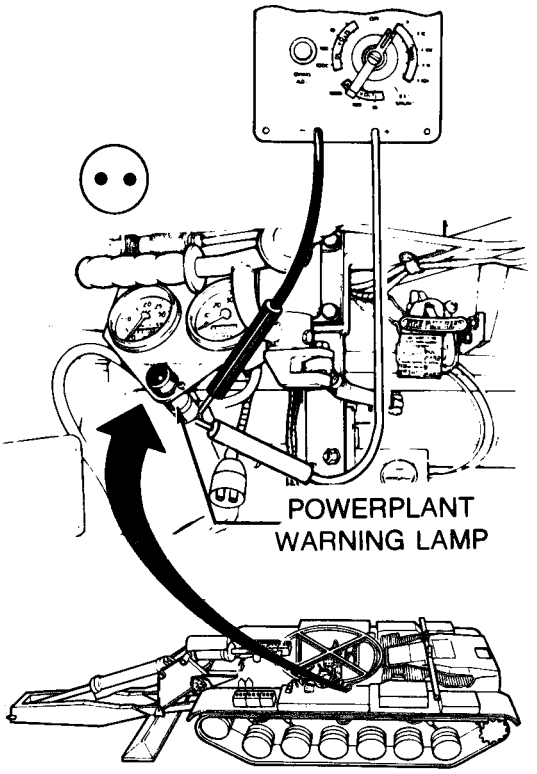
First Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).

Second Technician (Operator's Station)

- Disconnect front accessory harness connector from POWERPLANT WARNING LAMP connector.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect two probes of meter to the two contacts of POWERPLANT WARNING LAMP connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



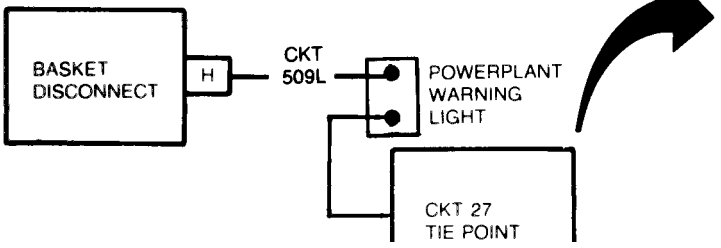
FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

13 **Replace POWERPLANT WARNING LAMP assembly (page 10-189).**

NO

YES

14
- **Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 509L wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-indicator panel harness.**
- **Connect front accessory harness connector to POWERPLANT WARNING LAMP.**



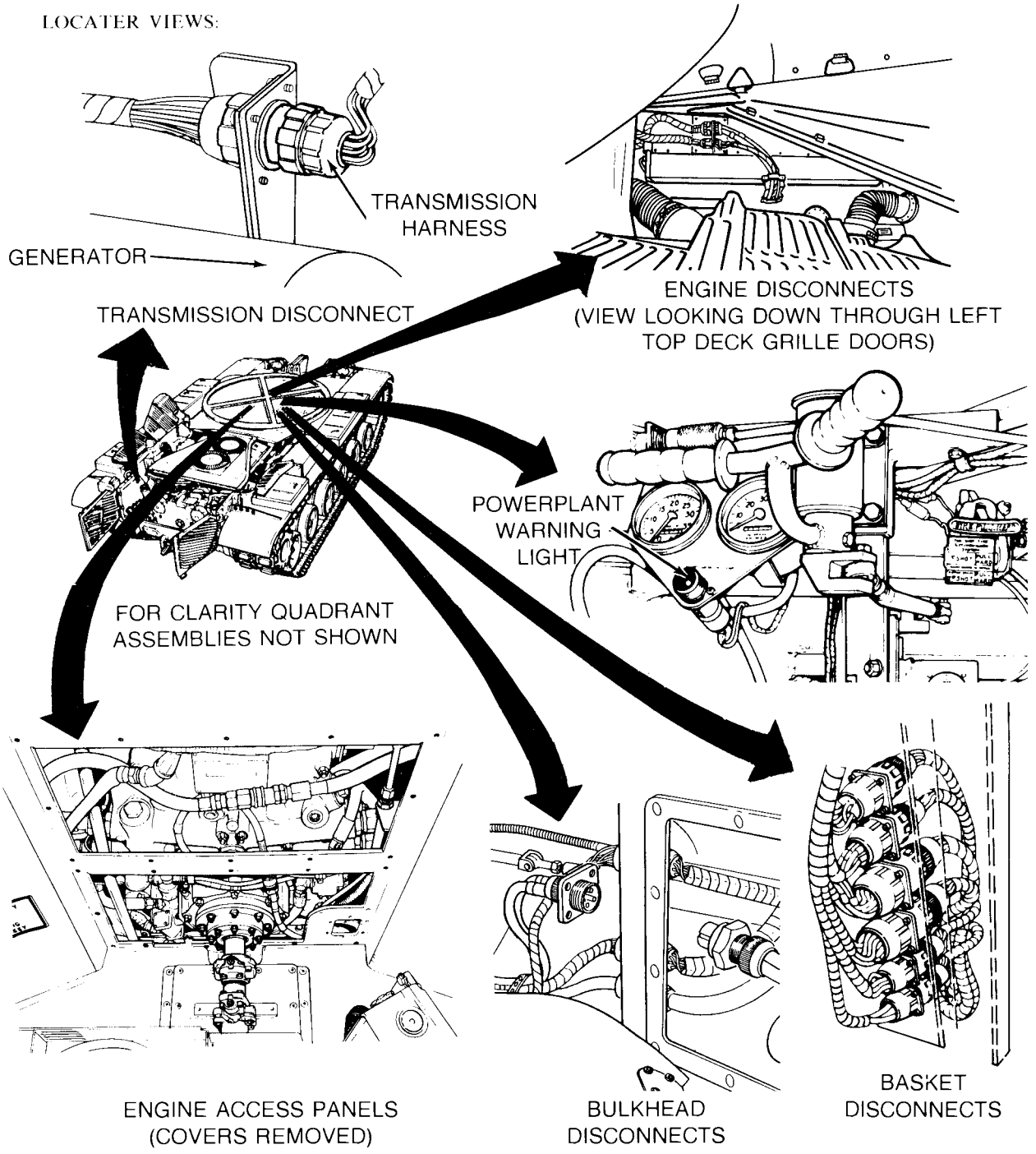
TA250388

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP

Symptom-42

POWERPLANT WARNING LAMP ON (ENGINE RUNNING — ALL GAGES READ NORMAL).

LOCATER VIEWS:



TA250389

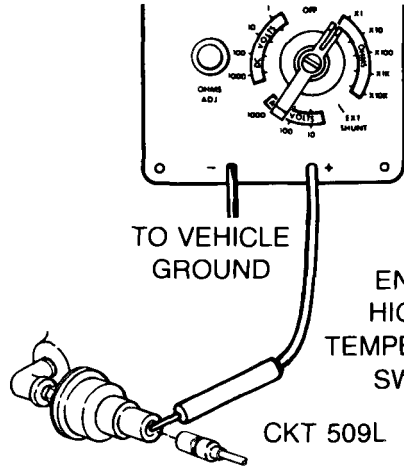
DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

Symptom-42

POWERPLANT WARNING LAMP ON (ENGINE RUNNING — ALL GAGES READ NORMAL).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



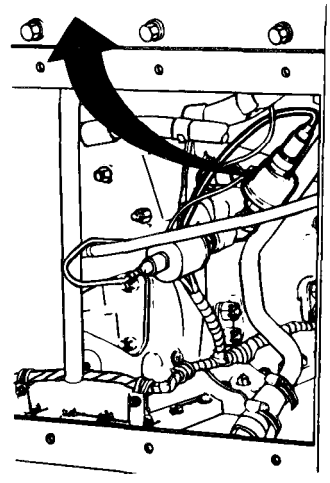
1 Check engine high oil temperature switch for short to ground (engine cold).

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Rear of Crew Compartment)

- Remove engine lower access cover (page 17-13).
- Disconnect engine electrical harness connector (CKT 509L) from engine high oil temperature switch.
- Set multimeter to OHMS X1 scale and zero meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to center contact of high oil temperature switch and black probe to ground.
- Check if meter indicates continuity.



Does meter indicate continuity, thereby indicating a short?

YES

2 Replace engine high oil temperature switch (page 10-219).

NO

TA250390

Symptom-42

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

3 **Check transmission high oil temperature switch for short to ground (engine cold).**

First Technician (Rear of Crew Compartment)

- Connect engine electrical harness connector to engine high oil temperature switch.

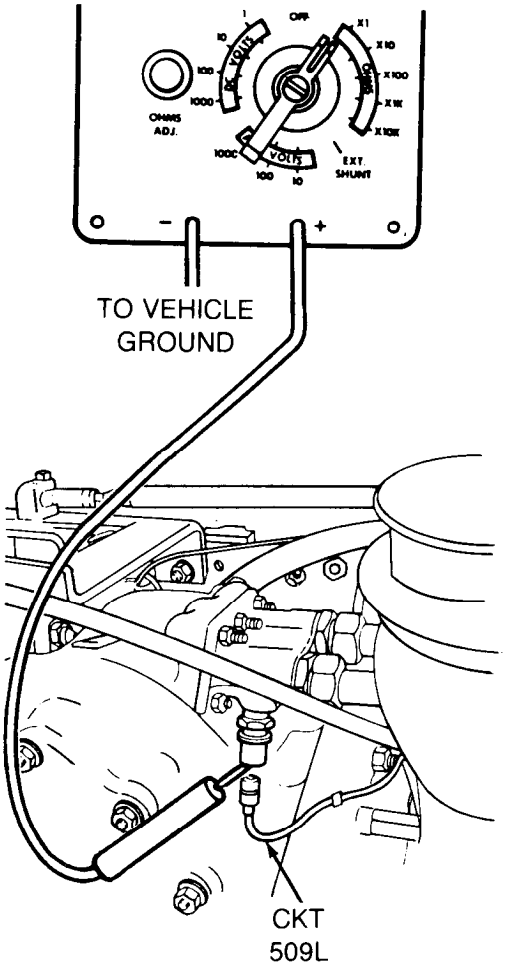
First and Second Technician (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

First Technician (Rear Grille Doors)

- Disconnect transmission harness connector (CKT 509L) from transmission high oil temperature switch.
- Connect red probe of meter to center contact of transmission high oil temperature switch and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short?



TRANSMISSION HIGH OIL TEMPERATURE SWITCH (RIGHT SIDE)

NO

YES

4
- **Replace transmission high oil temperature switch (page 10-230).**
- **Install engine access cover (page 17-14).**

TA250391

Symptom-42

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

5 **Check engine low oil pressure switch for short to ground.**

First Technician (Rear Grille Doors)

- Reconnect transmission harness connector to transmission high oil temperature switch.

First Technician (Rear of Crew Compartment)

- Disconnect engine electrical harness connector (CKT 509L) from engine low oil pressure switch.
- Connect red probe of meter to center contact of engine low oil pressure switch and black probe to ground.

Second Technician (Operator's Station)

- Start engine.

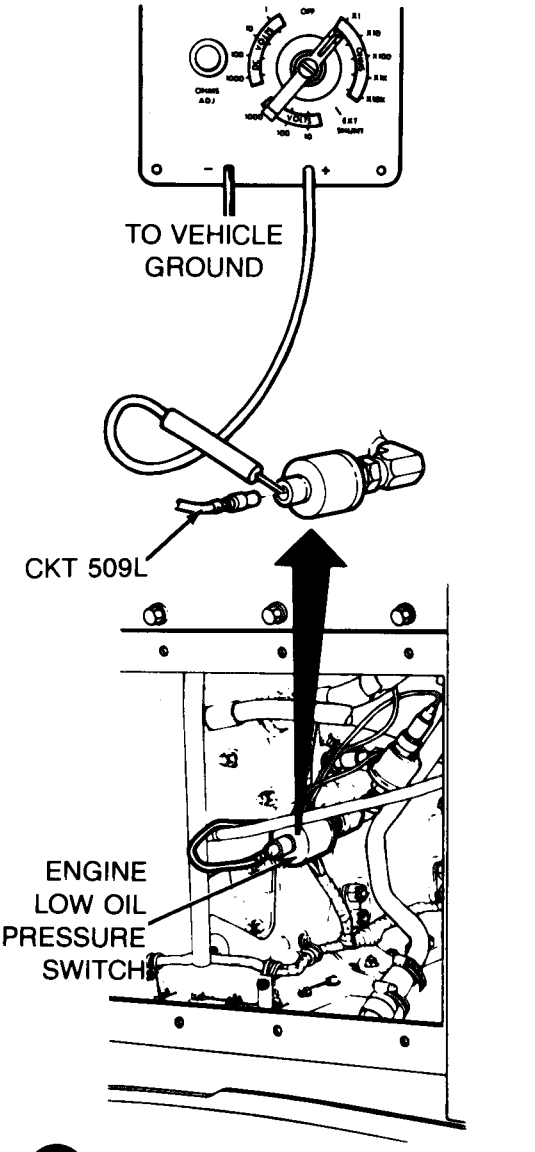
First Technician (Rear of Crew Compartment)

- Check if meter indicates continuity.

Second Technician (Operator's Station)

- Stop engine.

Did meter indicate continuity, thereby indicating a short?



NO

YES

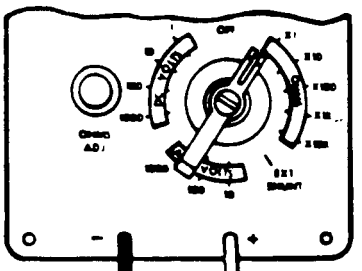
6

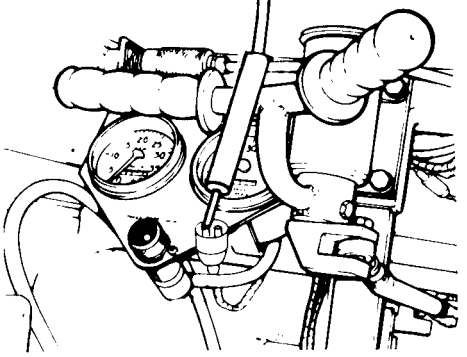
- **Replace engine low oil pressure switch (page 10-242).**
- **Install transmission shroud (page 9-6).**

TA250392

Symptom-42

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)





7 **Check basket-indicator panel harness (CKT 509L) at connector to powerplant warning light for short to ground.**

Second Technician (Operator's Station)

- Disconnect basket-indicator panel harness connector from gage instrument panel.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness connector (CKT 27) from master control panel.
- Disconnect basket-indicator panel harness connector (CKT 509L) from powerplant warning light assembly.
- Connect red probe of meter to one of the contacts in basket-indicator panel harness connector (CKT 509L) and black probe to ground.
- Check if meter indicates continuity.
- Repeat check moving red probe of meter to other contact in basket-indicator panel harness connector.

Does meter indicate continuity during either check, thereby indicating a short?

YES

NO

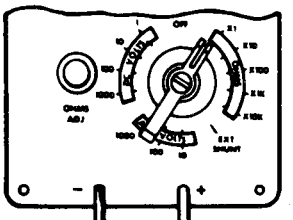
8

- **Replace powerplant warning lamp socket (page 10-189).**
- **Connect basket-control panel accessories harness connector to master control panel.**
- **Install master control panel (page 10-33).**
- **Connect basket-indicator panel harness connector to gage instrument panel.**
- **Connect engine electrical harness connector (CKT 509L) to engine low oil pressure switch.**
- **Install engine access cover (page 17-15).**
- **Install transmission shroud (page 9-6).**

TA250393

Symptom-42

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)



9 **Check front accessory harness (CKT 509L) at basket disconnect for short to ground.**

Second Technician (Operator's Station)

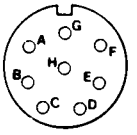
- Connect basket-control panel accessories harness connector to master control panel.
- Install master control panel (page 10-33).
- Connect basket-indicator panel harness connector to gage instrument panel.
- Reconnect basket-indicator panel harness connector to powerplant warning light assembly.

First Technician (Commander's Station)

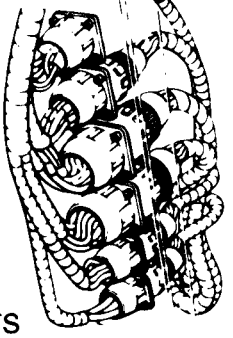
- Disconnect front accessory harness connector (CKT 509L) from basket disconnect.
- Connect red probe of meter to contact H (CKT 509L) of front accessory harness connector at basket disconnect and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short to ground?

TO VEHICLE GROUND



CONTACT H (CKT 509L)



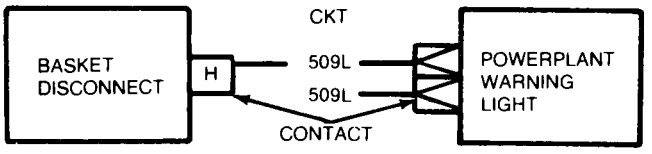
BASKET DISCONNECTS

YES

NO

10

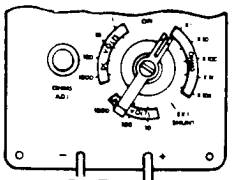
- **Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 509L wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-indicator panel harness.**
- **Connect front accessory harness connector to basket disconnect.**

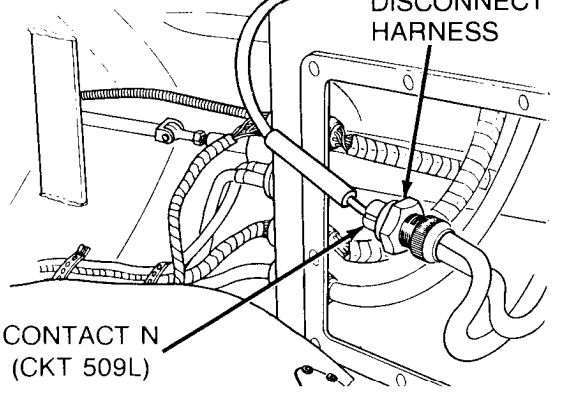


TA250394

Symptom-42

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)





11 **Check bulkhead engine disconnect harness (CKT 509L) at bulkhead disconnect for short to ground.**

First Technician (Commander's Station)

- Connect front accessory harness connector to basket disconnect.
- Disconnect bulkhead engine disconnect harness connector at bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact N (CKT 509L) of bulkhead engine disconnect harness connector and black probe to ground.
- Check if meter indicates continuity.

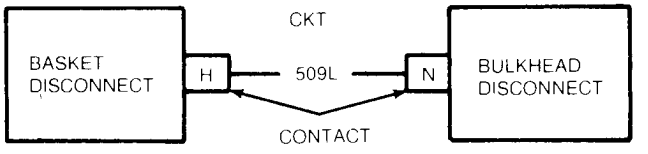
Does meter indicate continuity, thereby indicating a short?

YES

NO

12

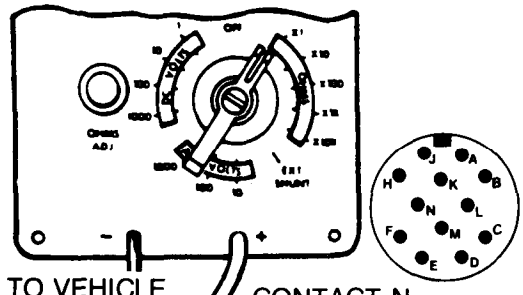
- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 509L wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Connect bulkhead engine disconnect harness connector at bulkhead disconnect.**
- **Connect engine electrical harness connector (CKT 509L) to engine low oil pressure switch.**
- **Install engine access cover (page 17-15).**
- **Install transmission shroud (page 9-6).**



TA250395

Symptom-42

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)



13 **Check engine electrical harness (CKT 509L) connector at engine disconnect for short to ground.**

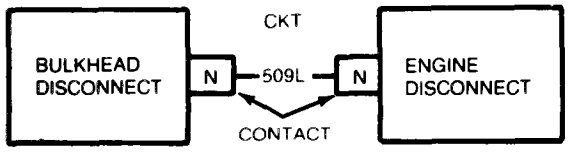
First Technician (Commander's Station)

- Connect bulkhead engine disconnect harness connector at bulkhead disconnect (page 10-269).

Second Technician (Left Top Deck Grille Doors)

- Open left top deck grille doors.
- Disconnect bulkhead engine disconnect harness connector at engine disconnect.
- Connect red probe of meter to contact N (CKT 509L) of engine electrical harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short?



YES

NO

14

- **Inspect bulkhead engine disconnect harness for bent/ broken connector contacts or loose CKT 509L wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective bulkhead engine disconnect harness.**
- **Connect bulkhead engine disconnect harness at engine disconnect.**
- **Connect engine electrical harness connector (CKT 509L) to engine low oil pressure switch.**
- **Install engine access cover (page 17-15).**
- **Install transmission shroud (page 9-6).**

TA250396

Symptom- 42

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

15 **Check transmission harness (CKT 509L) connector at transmission disconnect for short to ground.**

First Technician (Rear of Crew Compartment)

- Connect engine electrical harness connector to engine low oil pressure switch.

First Technician (Rear of Vehicle)

- Have powerplant removed (page 5-2).

First Technician (Right Side of Engine)

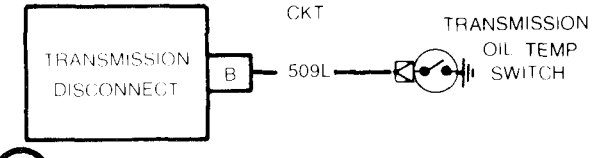
- Disconnect transmission harness connector from engine electrical harness connector at transmission disconnect.
- Connect red probe of meter to contact B (CKT 509L) of transmission harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short?

16

- **Repair transmission harness (page 10-298).**
- **Have powerplant installed (page 5-14).**

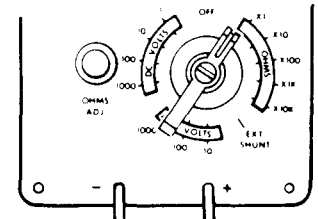
YES

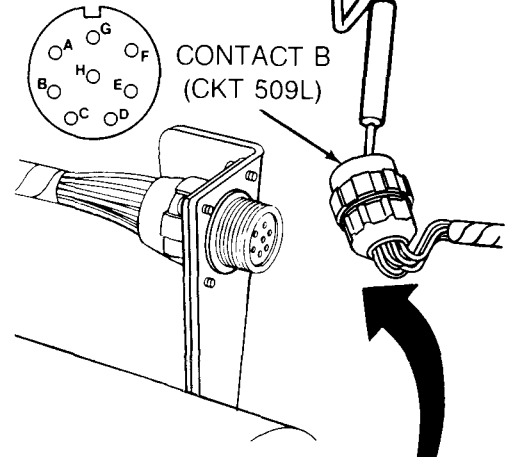


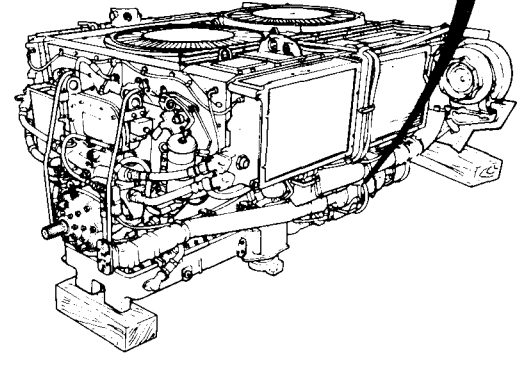
17

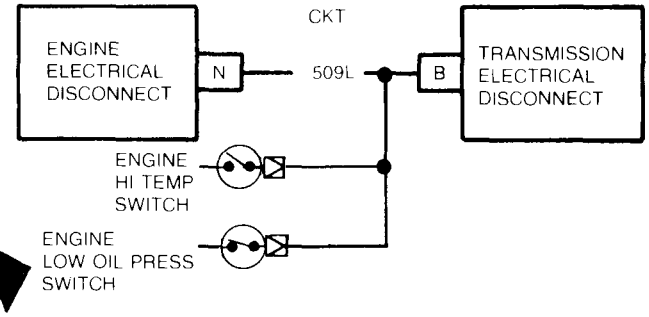
- **Repair engine electrical harness (page 10-298).**
- **Have powerplant installed (page 5-14).**

NO









TA250397

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP

Symptom-43

MASTER BATTERY INDICATOR LAMP WILL NOT LIGHT (THERE IS POWER IN VEHICLE).

1 Check continuity between MASTER BATTERY switch and MASTER BATTERY indicator lamp (CKT 459A).

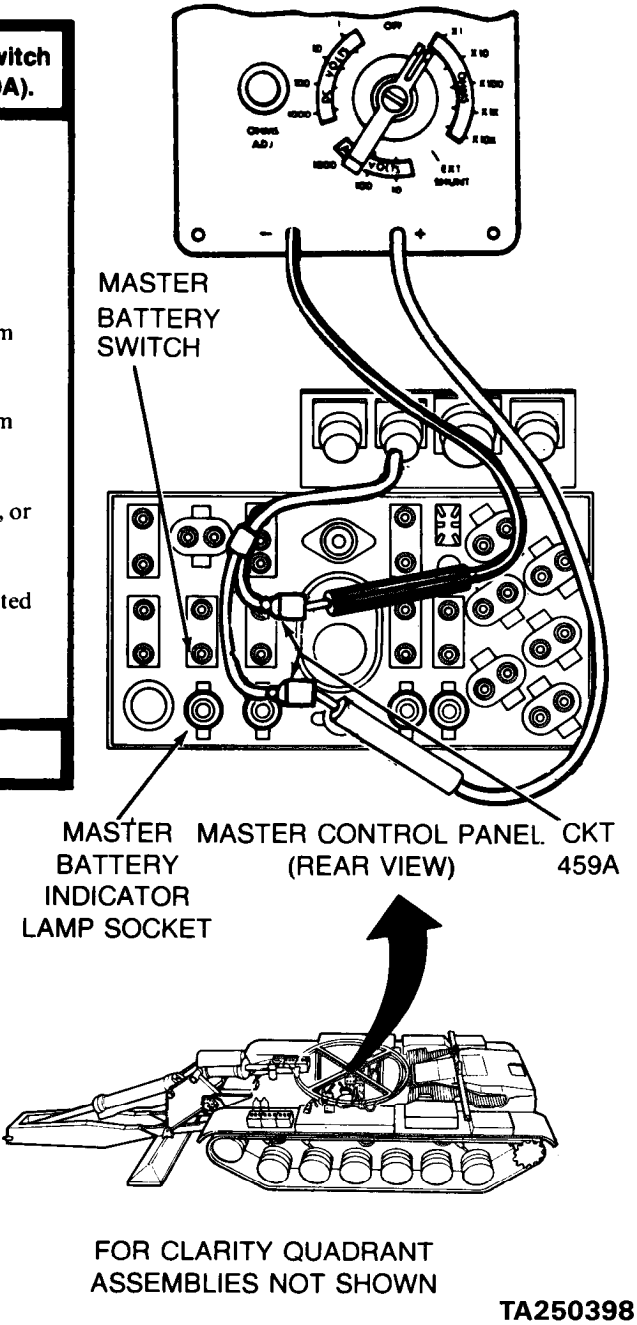
Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect starting harness lead (CKT 459A) from MASTER BATTERY switch.
- Disconnect starting harness lead (CKT 459A) from MASTER BATTERY indicator lamp socket.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect one meter probe to each of the disconnected starting harness leads.
- Check if meter indicates continuity.

Does meter indicate continuity?

2 Replace starting harness (page 10-274). — NO

3 Replace MASTER BATTERY indicator lamp socket (page 10-43). — YES



TA250398

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP

Symptom-44

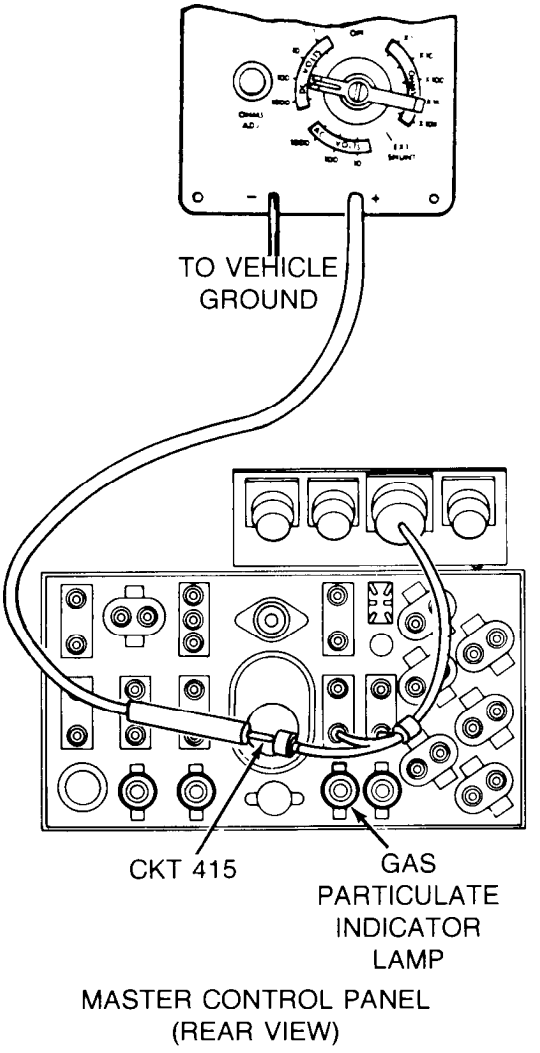
GAS PARTICULATE INDICATOR LAMP WILL NOT LIGHT (GAS PARTICULATE BLOWER WORKS).

1 Check for electrical power to gas particulate indicator lamp.

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect master control panel accessories harness connector (CKT 415) from gas particulate indicator lamp.
- Set multimeter to indicate 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to master control panel accessories harness connector (CKT 415) and black probe to ground.
- Set GAS PARTICULATE switch ON.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



YES → **2 Replace gas particulate indicator assembly (page 10-62).**

NO → **3 Replace master control panel accessories harness (page 10-91).**

TA250399

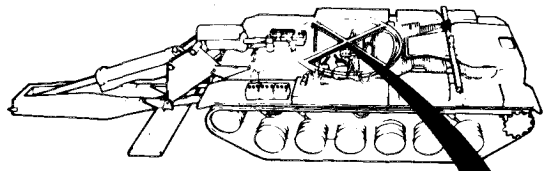
DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP

Symptom-45

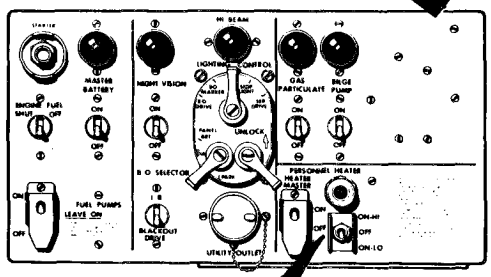
PERSONNEL HEATER INDICATOR LAMP WILL NOT LIGHT (PERSONNEL HEATER WORKS).

WARNING

Use extreme care when working with circuit 400. This circuit carries battery voltage at all times, whether MASTER BATTERY switch is ON or OFF.



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

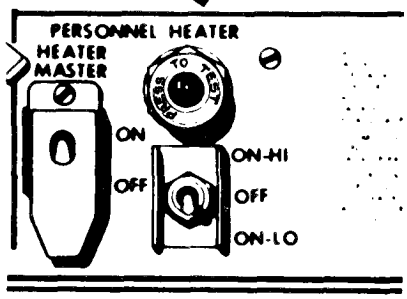


1 Check if PERSONNEL HEATER indicator lamp lights during PRESS TO TEST check.

Technician (Operator's Station)

- If heater is running, set PERSONNEL HEATER HI/LO switch OFF and wait 5 minutes for completion of heater purge cycle.
- If heater is not running, check that HEATER MASTER switch is ON.
- Push in PERSONNEL HEATER indicator lamp.

Does indicator lamp light?



MASTER CONTROL PANEL

YES

NO

2

- **Check for electrical power at PERSONNEL HEATER indicator lamp terminal 3 (CKT 405).**

- **See Step (6) .**

TA250400

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

Symptom-45

3 **Check CKT 407 for continuity from indicator lamp (terminal 2) to personnel heater HI/LO switch (terminal 2).**

Technician (Operator's Station)

- Set HEATER MASTER switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness from master control panel.
- Remove 4 screws, nuts and washers from master control panel accessories harness connector and unmount connector from master control panel.
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to terminal 2 of indicator lamp assembly (CKT 407).
- Connect black probe of meter to terminal 2 of PERSONNEL HEATER HI/LO switch (CKT 407).
- Check if meter indicates continuity.

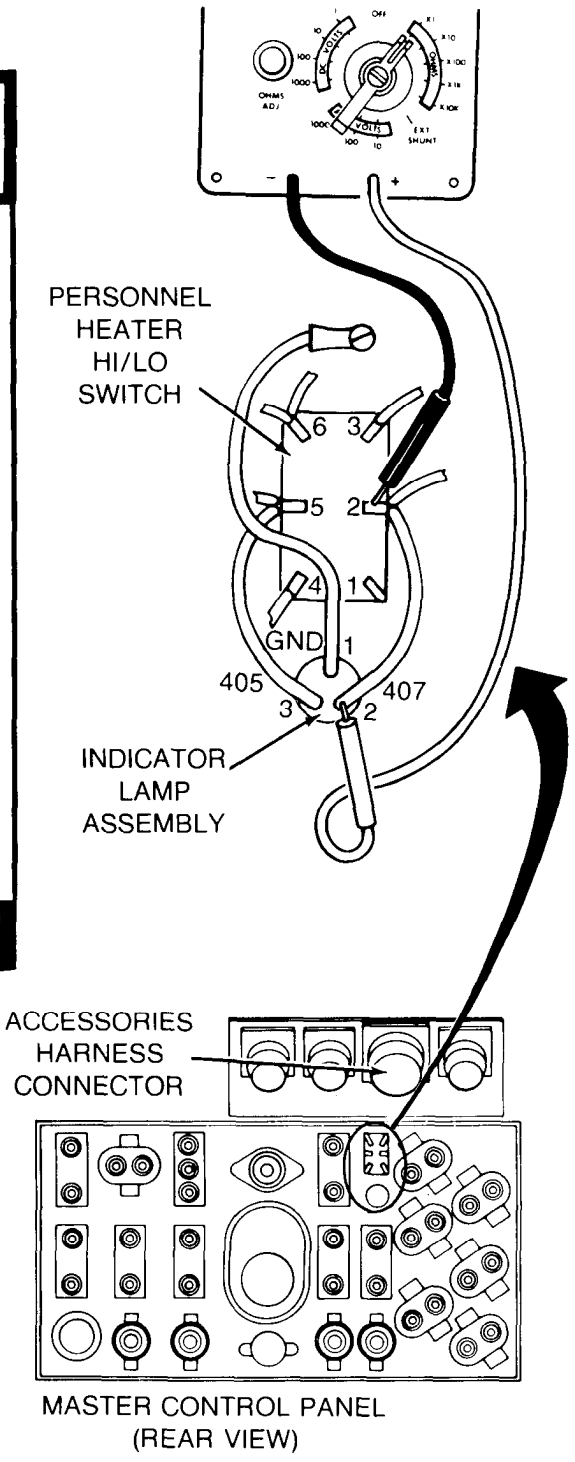
Does meter indicate continuity

4 **Replace personnel heater indicator lamp electrical lead (CKT 407) (CKT 407).**

NO

5 **Replace personnel heater indicator lamp socket (page 10-77).**

YES



TA250401

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

Symptom-45

FROM STEP (2)

WARNING

Use extreme care when working with circuit 400. This circuit carries battery voltage at all times, whether MASTER BATTERY switch is ON or OFF.

6 Check for electrical power at PERSONNEL HEATER indicator lamp terminal 3 (CKT 405).

Technician (Operator's Station)

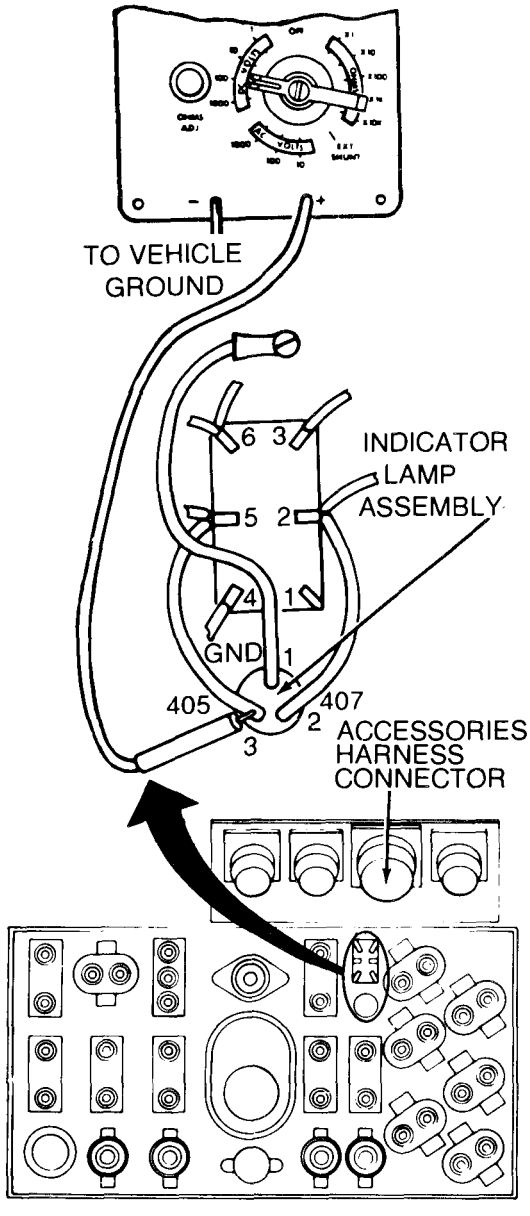
- Set HEATER MASTER switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness from master control panel.
- Remove 4 screws, nuts and washers from master control panel accessories harness connector and displace connector from master control panel.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-83).
- Connect red probe of meter to terminal 3 of personnel heater indicator lamp assembly (CKT 405) and black probe to ground.
- Set HEATER MASTER switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

YES

NO

7 Replace personnel heater indicator lamp electrical lead (CKT 405).



TA250402

Symptom-45

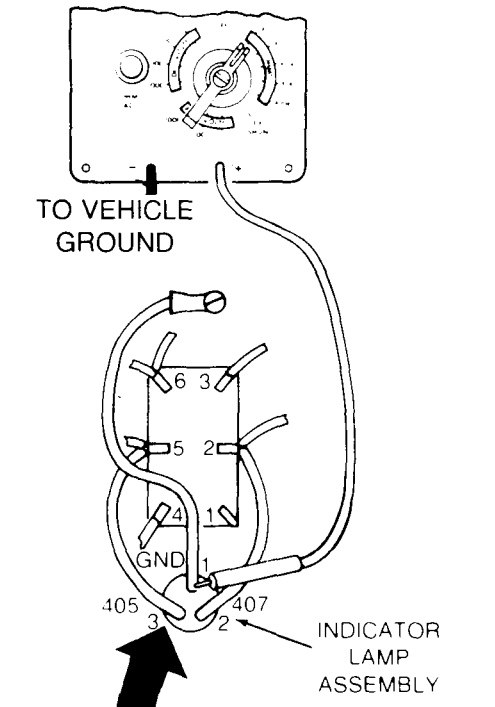
DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

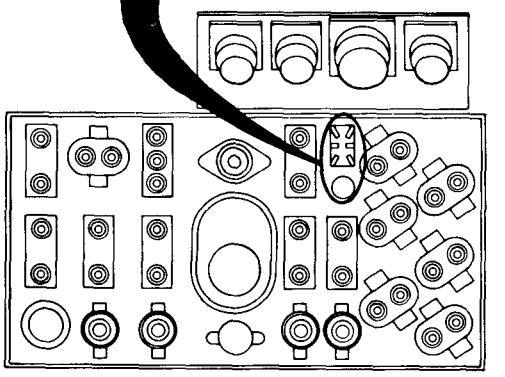
8 **Check personnel heater indicator lamp ground lead for continuity to ground.**

Technician (Operator's Station)

- Set HEATER MASTER switch OFF.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to terminal 1 of personnel heater indicator lamp assembly (CKT GND) and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?





NO

YES

9 **Replace personnel heater indicator lamp socket (page 10-77).**

TA250403

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

Symptom- 45

10 **Check personnel heater indicator lamp ground lead for proper connection.**

Technician (Operator's Station)

- Check if personnel heater indicator lamp assembly ground connection is loose or dirty.

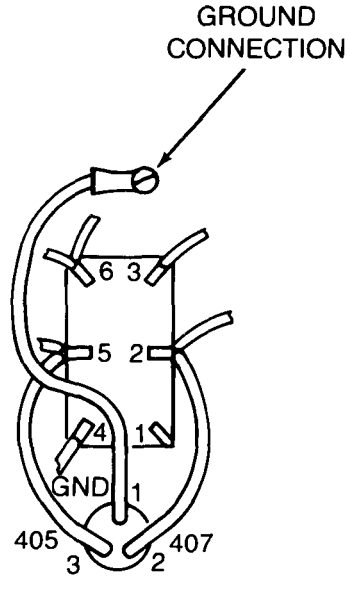
Is ground connection loose or dirty?

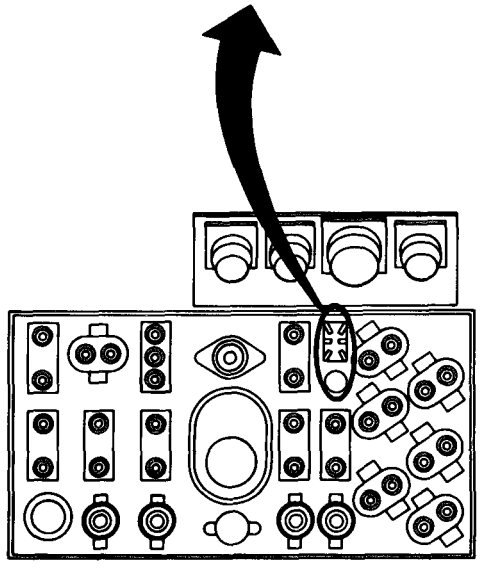
11
- **Clean and tighten loose ground connection.**
- **Install master control panel (page 10-33).**

YES

12
- **Replace personnel heater indicator lamp ground lead**
- **Install master control panel (page 10-33).**

NO





TA250404

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP

Symptom-46

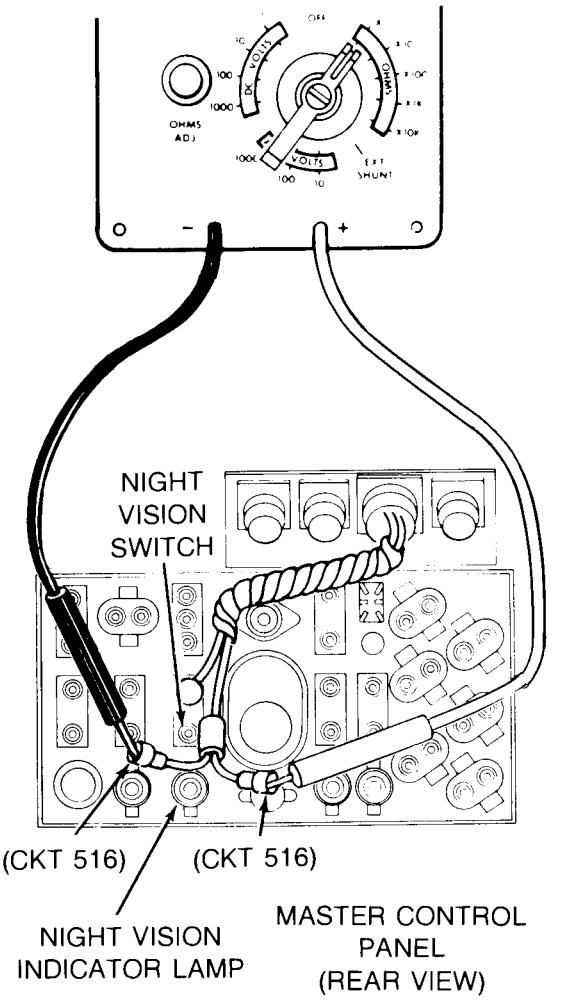
NIGHT VISION INDICATOR LAMP WILL NOT LIGHT (IR PERISCOPES WILL WORK)

1 **Check master control panel accessories harness (CKT 516) for continuity from NIGHT VISION switch to indicator lamp.**

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF
- Set NIGHT VISION switch OFF.
- Displace master control panel (page 10-33).
- Disconnect connectors (CKT 516) from indicator lamp and NIGHT VISION switch.
- Set meter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Place red probe of meter to indicator light cable connector and black probe to NIGHT VISION switch cable connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



NO → **2** **Replace master control panel accessories harness (page 10-91).**

YES → **3** **Replace NIGHT VISION indicator lamp socket (page 10-50).**

TA250405

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP

Symptom-47

HIGH BEAM INDICATOR LAMP WILL NOT LIGHT WHEN WHITE SERVICE AND/OR B.O. SERVICE HIGH BEAM LAMPS ARE ON.

NOTE

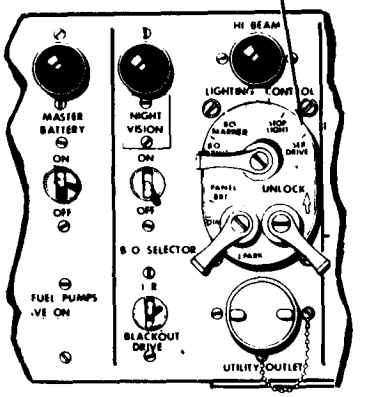
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

(1) Check if HI BEAM indicator lamp will light when B.O. service lamps are on.

Second Technician (Operator's Station)

- Turn LIGHTING CONTROL switch lever to B.O. DRIVE.
- Set B.O. SELECTOR switch to IR.
- Set MASTER BATTERY switch ON.
- Check if HI BEAM indicator lamp is lit.
- Press and release foot DIMMER SWITCH.
- Check if HIGH BEAM indicator lamp is lit.

Is HI BEAM indicator lamp lit?



MASTER CONTROL PANEL

YES

NO

(2)
- **Check if HI BEAM indicator lamp will light when white service lamps are on.**

- **See Step (10) .**

TA250406

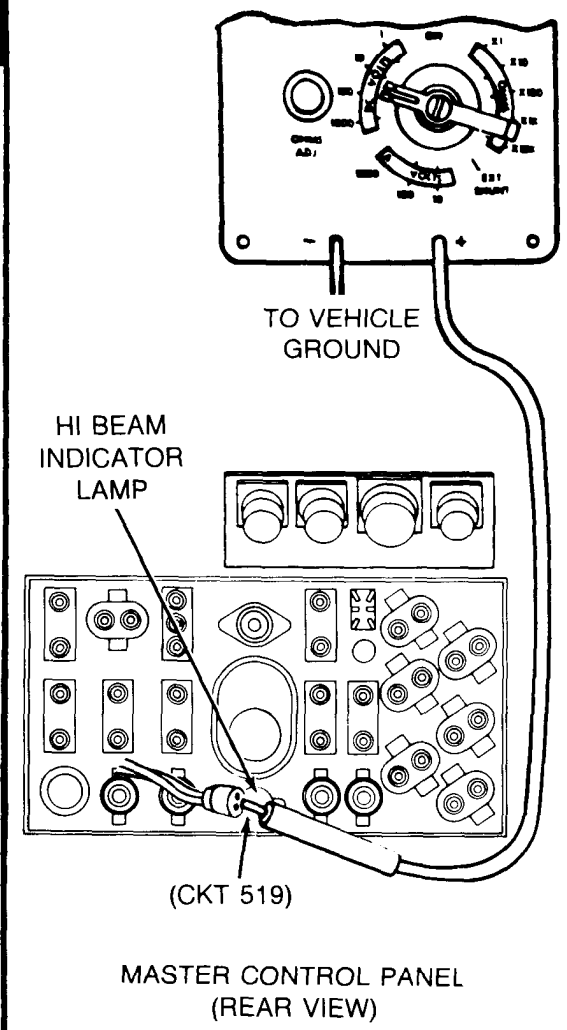
DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

Symptom-47

3 **Check master control panel accessories harness (CKT 519), at connector to HI BEAM indicator lamp, for electrical power (white service lamps).**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Turn LIGHTING CONTROL switch lever to SER DRIVE.
- Set PANEL light switch to BRT.
- Displace master control panel (page 10-33).
- Disconnect master control panel accessories harness connector from HI BEAM indicator lamp.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to one of the master control panel accessory harness connector contacts (CKT 519) at HI BEAM indicator lamp and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.
- Press and release foot DIMMER SWITCH.
- Check if meter indicates 18 to 30 volts dc.
- Repeat above check on other contact of master control panel accessories harness connector (CKT 519) at HI BEAM indicator lamp.



MASTER CONTROL PANEL (REAR VIEW)

Does meter indicate 18 to 30 volts dc at either contact?

NO

YES

4 **Replace high beam indicator lamp assembly (page 10-54).**

TA250407

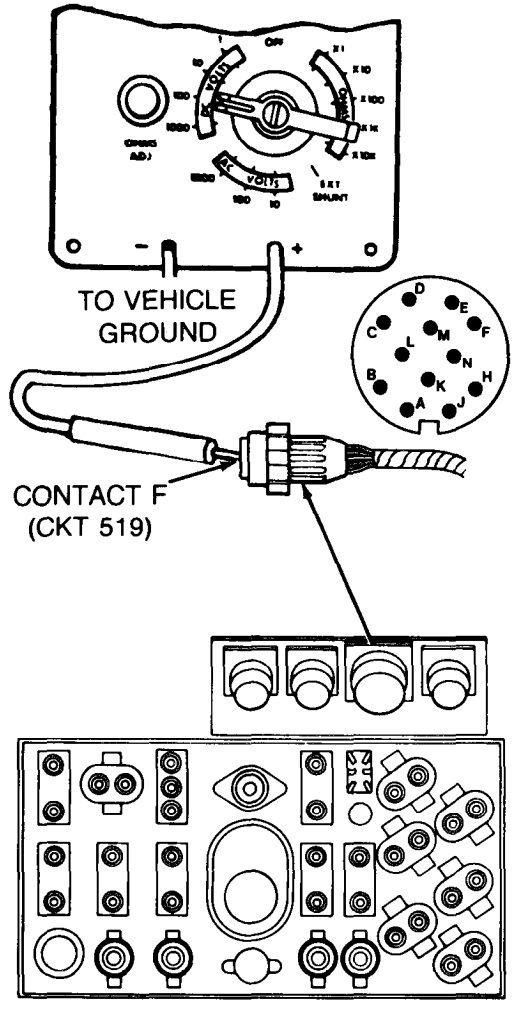
Symptom-47

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

5 **Check contact F of basket-control panel accessories harness connector (CKT 519) at master control panel for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Connect master control panel accessories harness connector to HI BEAM indicator lamp.
- Disconnect basket-control panel accessories harness connector from master control panel.
- Connect red probe of meter to contact F (CKT 519) of basket-control panel accessories harness connector at master control panel and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.
- Press and release foot DIMMER SWITCH.
- Check if meter indicates 18 to 30 volts dc.



Does meter indicate 18 to 30 volts dc at either foot DIMMER SWITCH position?

NO

YES

6 **Replace master control panel accessories harness (page 10-91).**

TA250408

Symptom-47

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

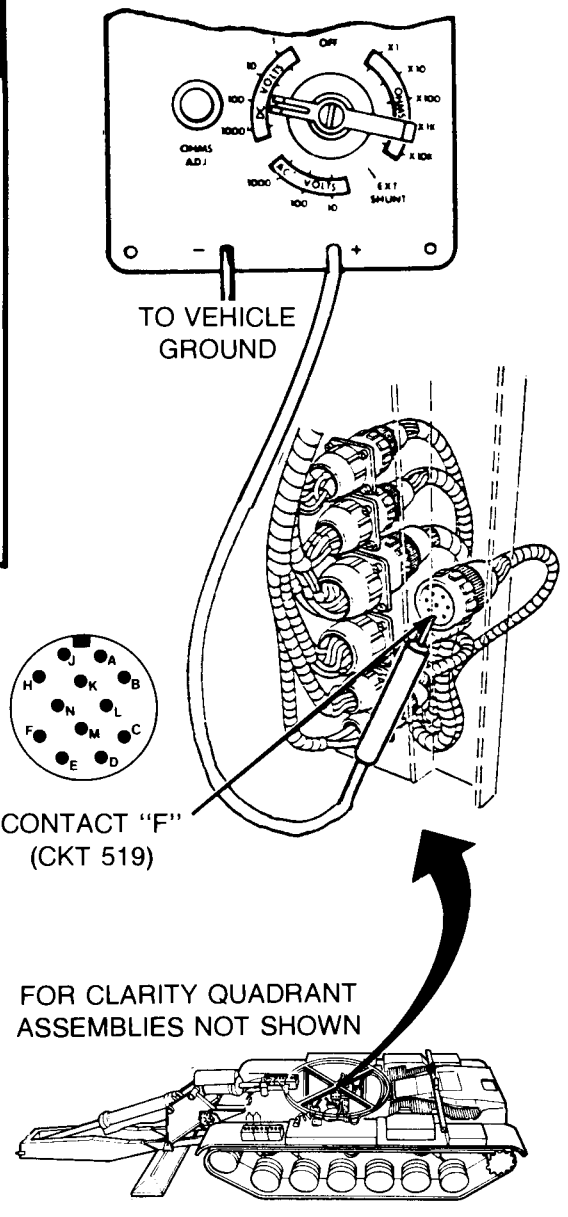
7 **Check contact F of front accessory harness connector (CKT 519) at basket disconnect for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Connect basket-control panel accessories harness connector to master control panel.

First Technician (Commander's Station)

- Disconnect front accessory harness connector (CKT 519) from basket disconnect.
- Connect red probe of meter to contact F (CKT 519) of front accessory connector at basket disconnect and black probe to ground.



TA250409

Symptom-47

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

STEP (7) CONTINUED

Second Technician (Operator's Station)

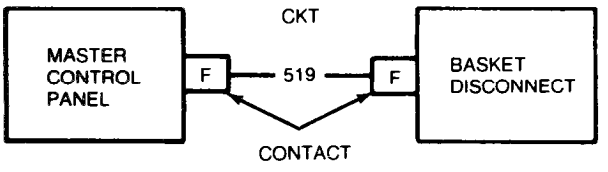
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.
- Press and release foot DIMMER SWITCH.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc at either foot DIMMER SWITCH position?

YES

8

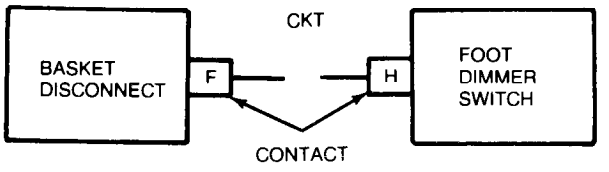
- **Inspect basket-control panel accessories harness for bent/broken connector contacts or loose CKT 519 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-control panel accessories harness.**
- **Connect front accessory harness connector to basket disconnect.**



NO

9

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 519 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Connect front accessory harness connector to basket disconnect.**



TA250410

Symptom-47

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

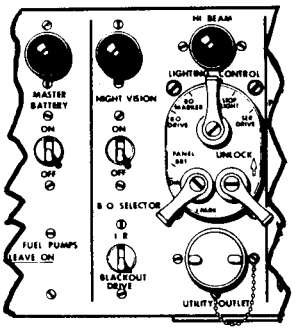
FROM STEP (2)

10 Check if HI BEAM indicator lamp will light when white service lamps are on.

Second Technician (Operator's Station)

- Turn LIGHTING CONTROL switch to SER DRIVE.
- Set PANEL switch to BRT.
- Visually check if HI BEAM indicator lamp is lit.
- Press and release foot DIMMER SWITCH.
- Visually check if HI BEAM indicator lamp is lit.

Is HI BEAM indicator lamp lit?



YES

NO

11 Replace high beam indicator lamp assembly (page 10-54).

TA250411

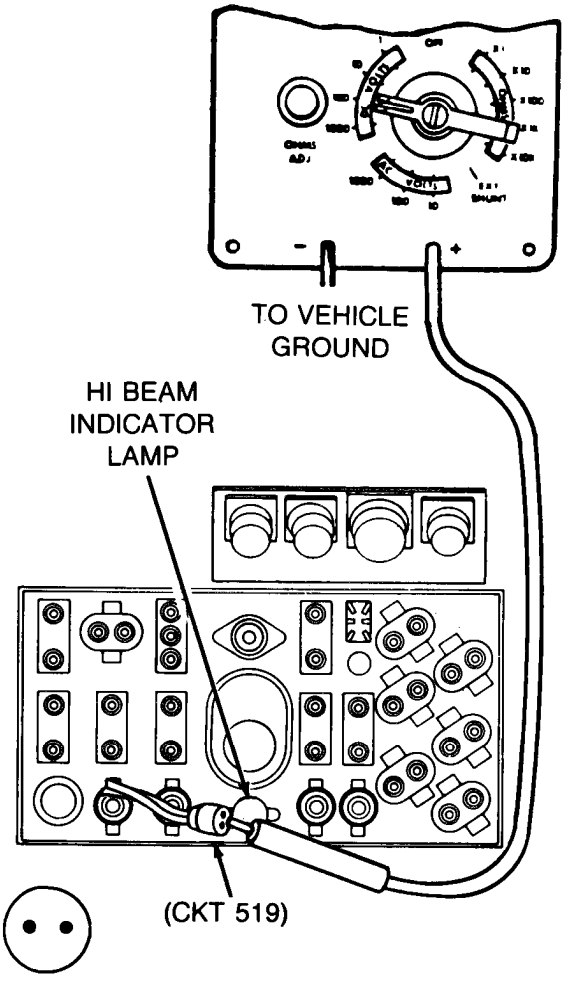
Symptom-47

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

12 **Check master control panel accessories harness (CKT 519), at connector to HI BEAM indicator lamp, for electrical power (B.O. service lamps).**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Turn LIGHTING CONTROL switch lever to B.O. DRIVE.
- Set B.O. SELECTOR switch to IR.
- Displace master control panel (page 10-33).
- Disconnect master control panel accessories harness connector from HI BEAM indicator lamp.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89. (page 4-81).
- Connect red probe of meter to one of the master control panel accessories harness connector contacts (CKT 519) at HI BEAM indicator lamp and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.
- Press and release foot DIMMER SWITCH.
- Check if meter indicates 18 to 30 volts dc.
- Repeat above check on other contact of master control panel accessories harness connector (CKT 519) at HI BEAM indicator lamp.



Does meter indicate 18 to 30 volts dc at either contact?

NO

YES

13 **Replace high beam indicator lamp assembly (page 10-54).**

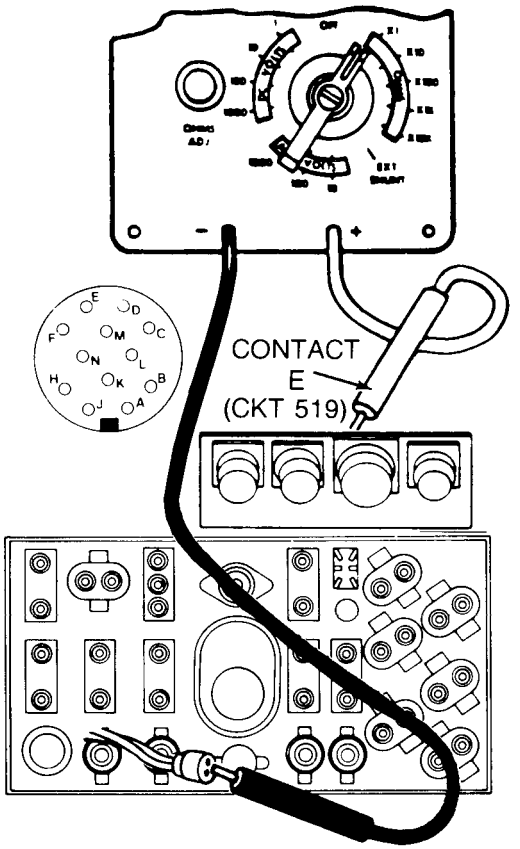
TA250412

Symptom-47

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

14 **Check master control panel accessories harness (CKT 519) for continuity from contact E of master control panel connector to contacts of connector at HI BEAM indicator lamp.**

- Set MASTER BATTERY switch OFF.
- Disconnect basket control panel accessories harness connector from master control panel.
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact E (CKT 519) of master control panel accessories harness connector to master control panel.
- Connect black probe of meter to one of the master control panel accessories harness connector contacts (CKT 519) at HI BEAM indicator lamp.
- Check if meter indicates continuity.
- Repeat above check on other contact of master control panel accessories harness connector (CKT 519) at HI BEAM indicator lamp.



Does meter indicate continuity at either contact?

YES

NO

15 **Replace master control panel accessories harness (page 10-91).**

TA250413

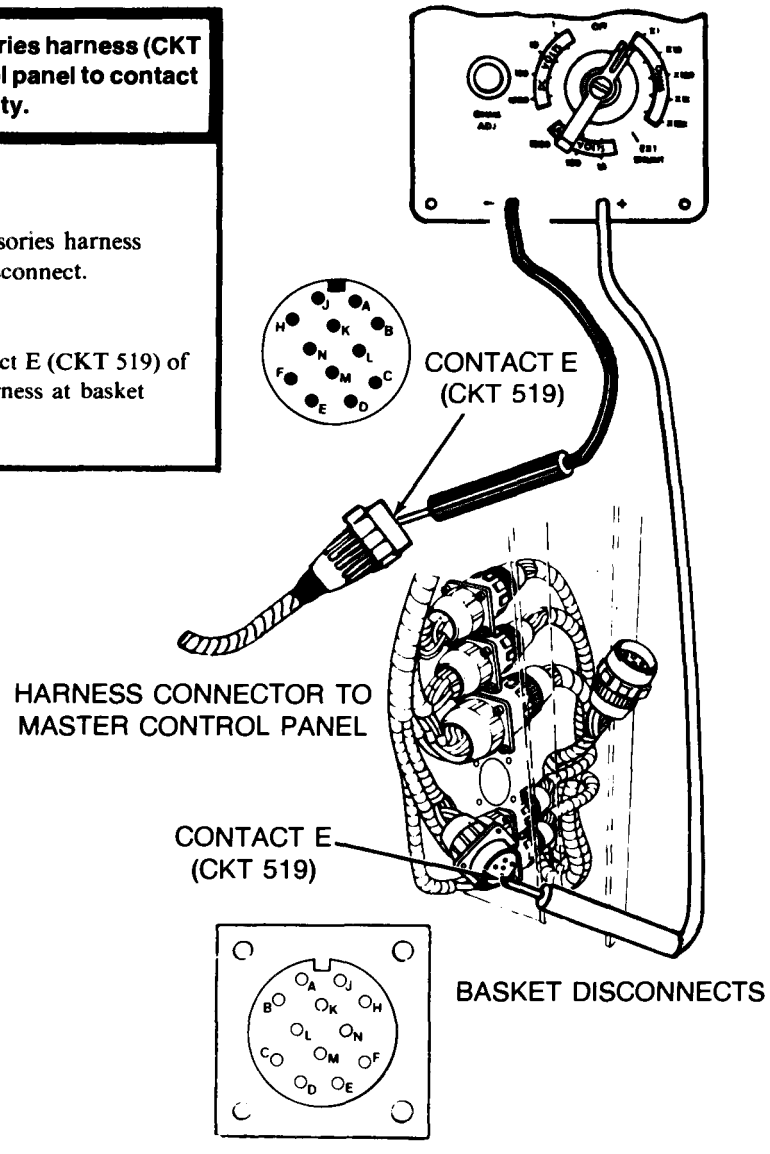
Symptom-47

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

16 **Check basket control panel accessories harness (CKT 519) from contact E at master control panel to contact E at basket disconnect for continuity.**

First Technician (Commander's Station)

- Displace basket-control panel accessories harness connect or (CKT 519) at basket disconnect.
- Connect red probe of meter to contact E (CKT 519) of basket-control panel accessories harness at basket disconnect.



TA250414

Symptom- 47 **DETAILED TROUBLESHOOTING PROCEDURE**
INDICATOR - LAMP
(Continued)

STEP (16) CONTINUED

Second Technician (Operator's Station)

- Connect black probe of meter to contact E (CKT 519) of basket-control panel accessories harness at master control panel.
- Check if meter indicates continuity.

Does meter indicate continuity?

YES

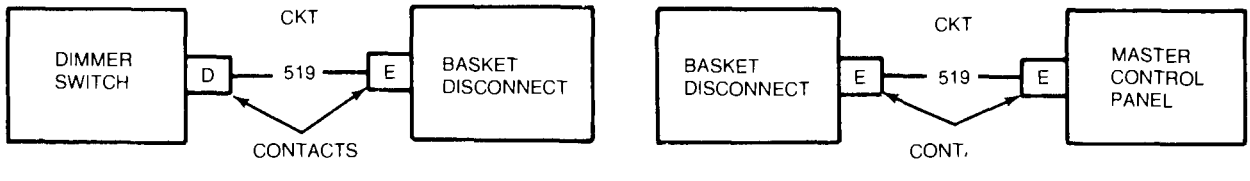
17

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 519 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Install basket-control panel accessories harness connector at basket disconnect.**
- **Connect basket-control panel accessories harness to master control panel.**
- **Install master control panel (page 10-33).**

NO

18

- **Inspect basket-control panel accessories harness for bent/broken connector contacts or loose CKT 519 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-control panel accessories harness**
- **Connect basket-control panel accessories harness connector to master control panel.**
- **Install master control panel (page 10-33).**
- **Install basket control panel accessories harness connector at basket disconnect.**



TA250415

Symptom-48

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP

SMOKE GENERATOR INDICATOR LAMP WILL NOT LIGHT (SMOKE GENERATOR WILL MAKE SMOKE).

1 Check smoke generator switch assembly for continuity.

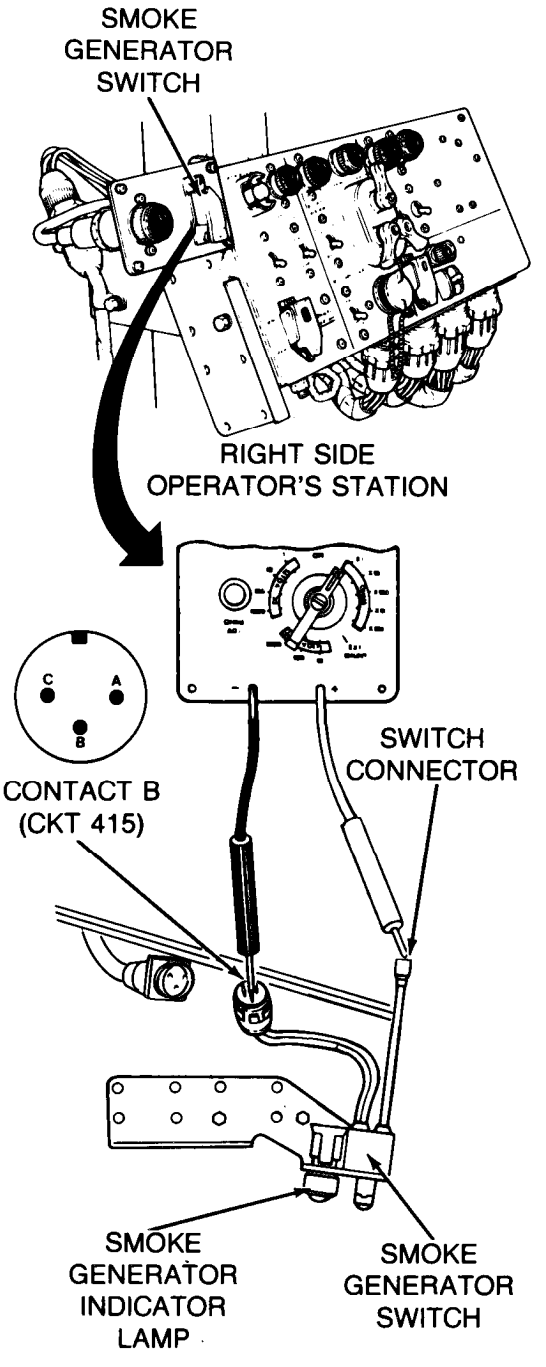
Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set SMOKE GENERATOR switch OFF.
- Disconnect SMOKE GENERATOR switch connector from SMOKE GENERATOR indicator lamp.
- Disconnect SMOKE GENERATOR switch assembly connector from SMOKE GENERATOR switch harness connector.
- Set SMOKE GENERATOR switch ON.
- Set multimeter to OHMS X1 scale and zero meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to SMOKE GENERATOR switch connector.
- Connect black probe of meter to contact B (CKT 415) of SMOKE GENERATOR switch assembly connector.
- Check if meter indicates continuity.

Does meter indicate continuity?

2 Replace smoke generator switch (page 21-2). — NO

YES



TA250416

DETAILED TROUBLESHOOTING PROCEDURE
INDICATOR - LAMP
(Continued)

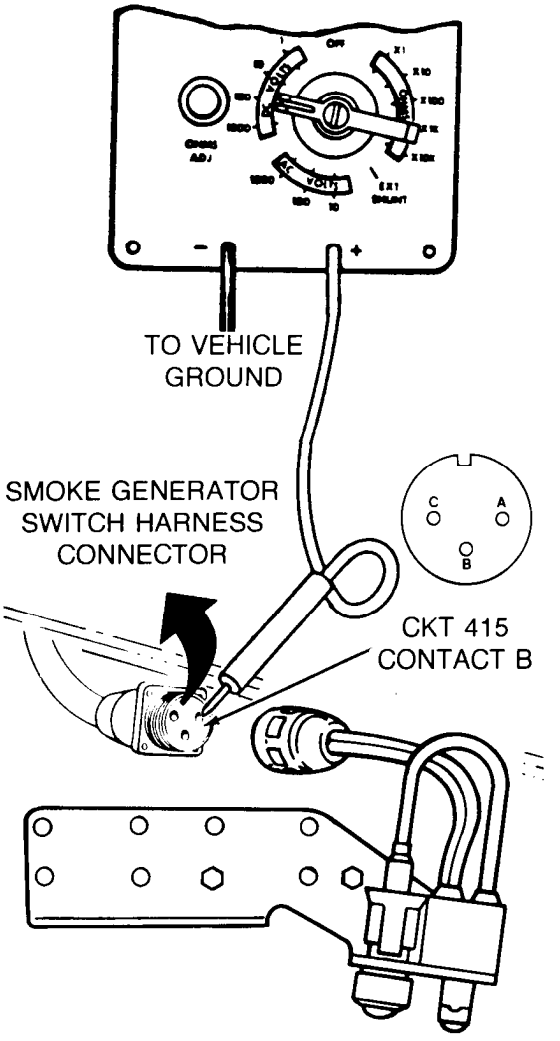
Symptom-48

3 **Check smoke generator switch harness (CKT 415) for electrical power.**

Technician (Operator's Station)

- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact B (CKT 415) of smoke generator switch harness connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



NO

4
- **Repair smoke generator switch harness (page 10-298).**
- **Connect SMOKE GENERATOR switch connector to SMOKE GENERATOR indicator lamp.**

YES

5 **Replace indicator lamp socket (page 21-5).**

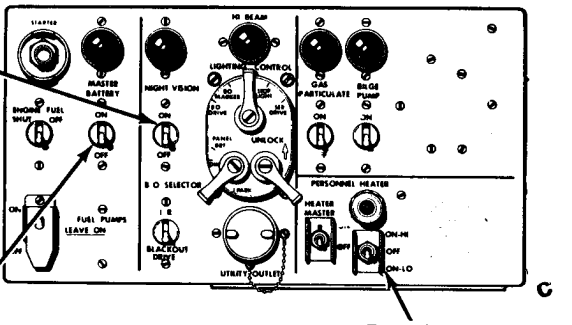
TA250417

Symptom-49 **DETAILED TROUBLESHOOTING PROCEDURE**
SUPPORT SYSTEM - COMMUNICATIONS

STATIC OR WHINING NOISE IN RADIO. (ELECTROMAGNETIC INTERFERENCE - EMI)

CAUTION
Turn off radio set (TM5-5420-202-10) before starting engine to prevent possible damage to communications equipment.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



1 **Check if static is caused by vehicle electrical equipment (vehicle not moving).**

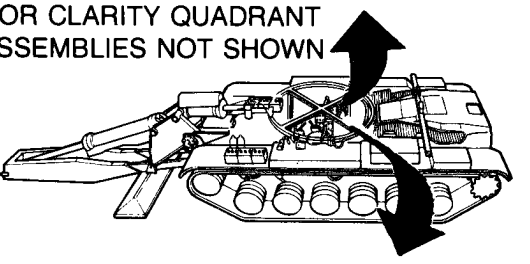
Second Technician (Operator's Station)

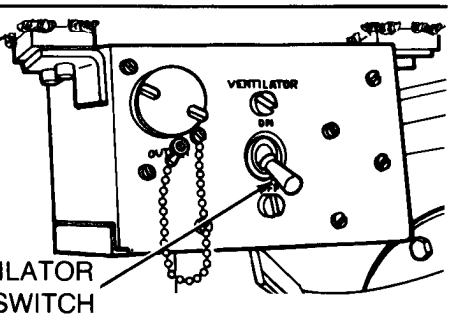
- Start engine.
- Set PERSONNEL HEATER HI/LO switch ON - LO.
- Check that LIGHTING CONTROL switch is OFF.
- Set NIGHT VISION switch ON.
- Set VENTILATOR switch ON.

First Technician (Commander's Station)

- Turn on radio set (TM 5-5420-202-10).
- Listen for static in radio helmet.

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN





Can static be heard when vehicle electrical equipment is operating - vehicle not moving?

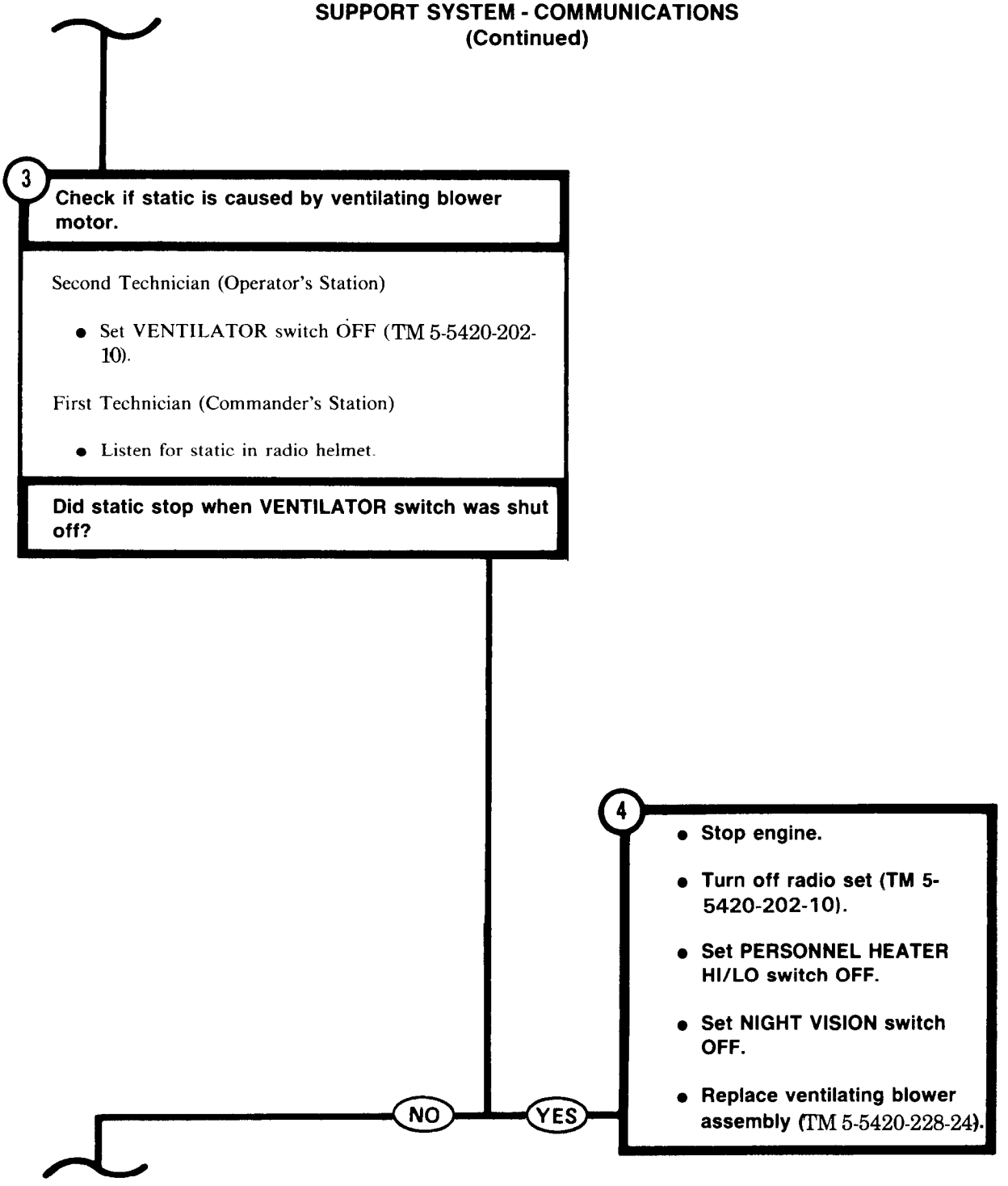
YES — NO

2
- **EMI is a result of vehicle movement - check if static is caused by broken or missing static springs in support rollers.**
- **See Step (14).**

TA250418

Symptom-49

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)



TA250419

Symptom-49

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

5 **Check if static is caused by infrared (IR) powerpacks.**

Second Technician (Operator's Station)

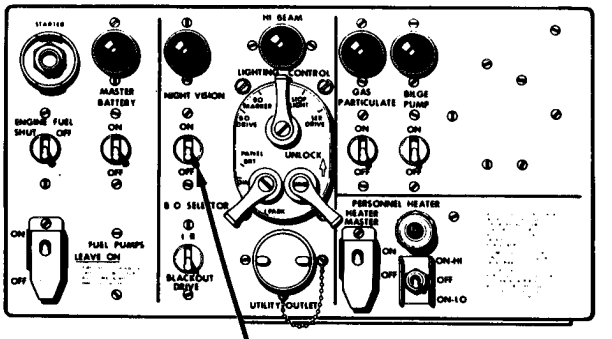
- Set NIGHT VISION switch OFF.

First Technician (Commander's Station)

- Wait two or three minutes for high voltage present inside IR powerpacks to discharge, then listen for static in radio helmet.

Did static stop when IR powerpacks were shut off?

MASTER CONTROL PANEL



NIGHT VISION SWITCH

NO

YES

6

- **Check which IR powerpack is causing static.**
- **See Step (19).**

TA250420

Symptom-49

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

7 **Check if static is a result of engine running.**

Second Technician (Operator's Station)

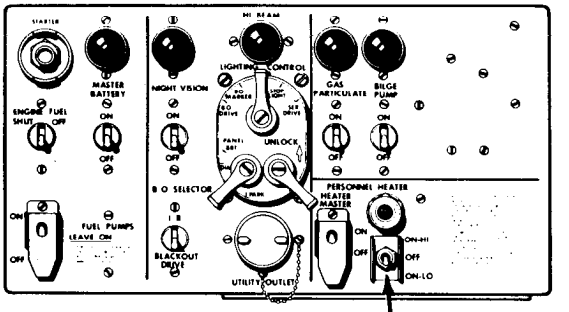
- Stop engine but do not set MASTER BATTERY, HEATER MASTER, PERSONNEL HEATER HI/LO switch OFF.

First Technician (Commander's Station)

- Listen for static in radio helmet.

Did static stop when engine was shut off (thereby stopping air cleaner blower motors and generator)?

MASTER CONTROL PANEL



PERSONNEL HEATER HI-LO SWITCH

NO

YES

8

- **Check if static is caused by air cleaner blower motors.**
- **See Step (25) .**

TA250421

Symptom-49

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

9 **Check if static is caused by personnel heater.**

Second Technician (Operator's Station)

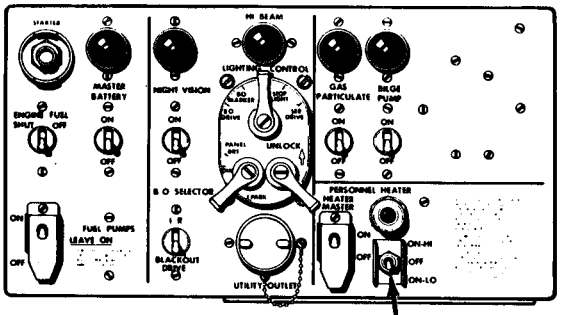
- Set PERSONNEL HEATER HI/LO switch OFF.

First Technician (Commander's Station)

- After personnel heater blower motor stops running (about 5 minutes) listen for static in radio helmet.

Did static stop when personnel heater was shut off?

MASTER CONTROL PANEL



PERSONNEL HEATER HI-LO SWITCH

NO

YES

10

- **Check if static is caused by personnel heater fuel pump.**
- **See Step (40).**

TA250422

Symptom-49

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

11 **Check if static is caused by fuel tanks electrical fuel pumps.**

Second Technician (Commander's Station)

- Set FUEL PUMPS switch OFF.

First Technician (Commander's Station)

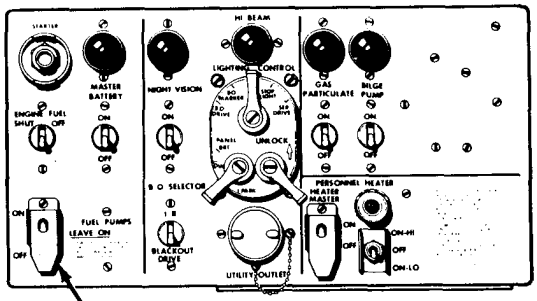
- Listen for static in radio helmet.

Second Technician (Operator's Station)

- Set FUEL PUMPS switch ON.

Did static stop while fuel pumps were shut off?

MASTER CONTROL PANEL



FUEL PUMPS SWITCH

YES

12

- **Check if static is caused by right fuel tank electrical fuel pump.**
- **See Step (43).**

NO

13

- **Turn off radio set (TM 5-5420-202-10).**
- **Notify support maintenance of EMI problem.**

TA250423

Symptom-49

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

FROM STEP (2)

NOTE

Number one support roller on left side of vehicle is used to drive speedometer. It does not have a static spring.

14 **Check if static is caused by broken or missing static springs in support rollers.**

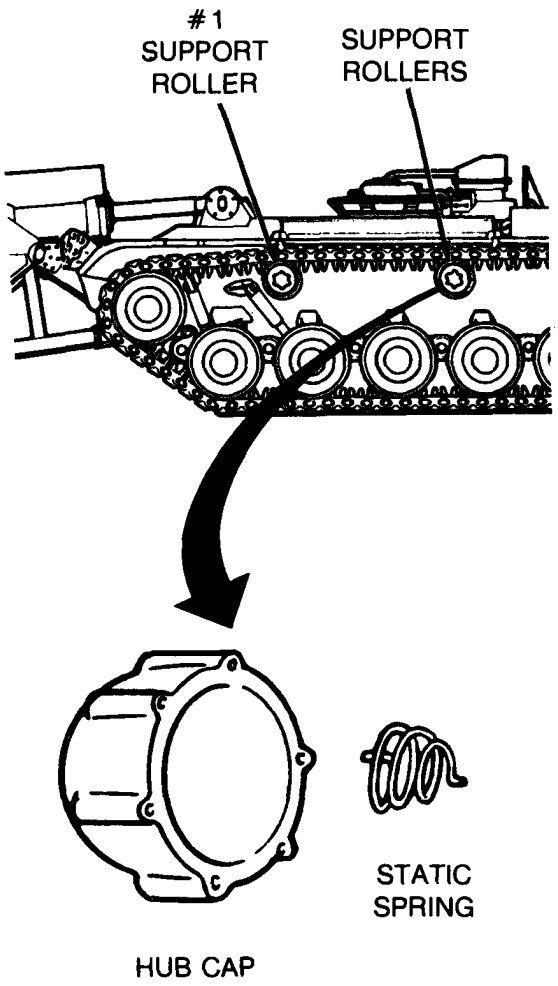
Second Technician (Operator's Station)

- Stop engine.

Both Technicians (Left and Right Side of Vehicle)

- Remove hub caps from support rollers (page 14-36).
- Check for broken and missing static springs.

Are any static springs broken or missing?



NO

YES

15 **Replace broken and missing static springs.**

TA250424

Symptom-49

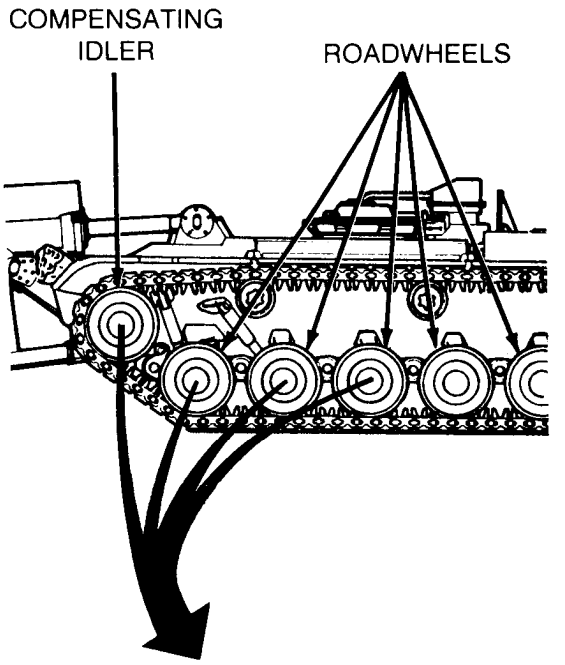
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

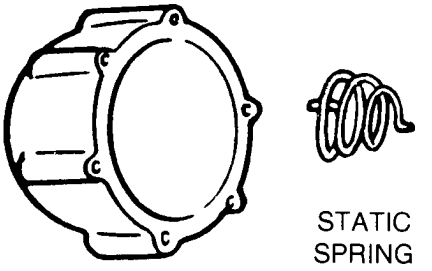
16 **Check if static is caused by broken or missing static springs in roadwheels and compensating idler.**

Both Technicians (Left and Right Sides of Vehicle)

- Install hub caps on support rollers (page 14-42).
- Remove hub caps from roadwheels and compensating idlers (page 14-2).
- Check for broken and missing static springs.

Are any static springs broken or missing?





NO

17
- **Notify support maintenance of EMI problem.**
- **Install hubcaps (page 14-4).**

YES

18 **Replace broken and missing static springs.**

TA250425

Symptom-49

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

FROM STEP (6)

19 **Check which IR powerpack is causing static.**

Second Technician (Operator's Station)

- Stop engine.
- Set PERSONNEL HEATER HI/LO switch OFF.

First Technician (Commander's Station)

- Turn off radio set (TM 5-5420-202-20).
- Remove right hand floor access cover (page 17-7).
- Disconnect front accessory harness connector (CKT 516) from one of the IR power packs.

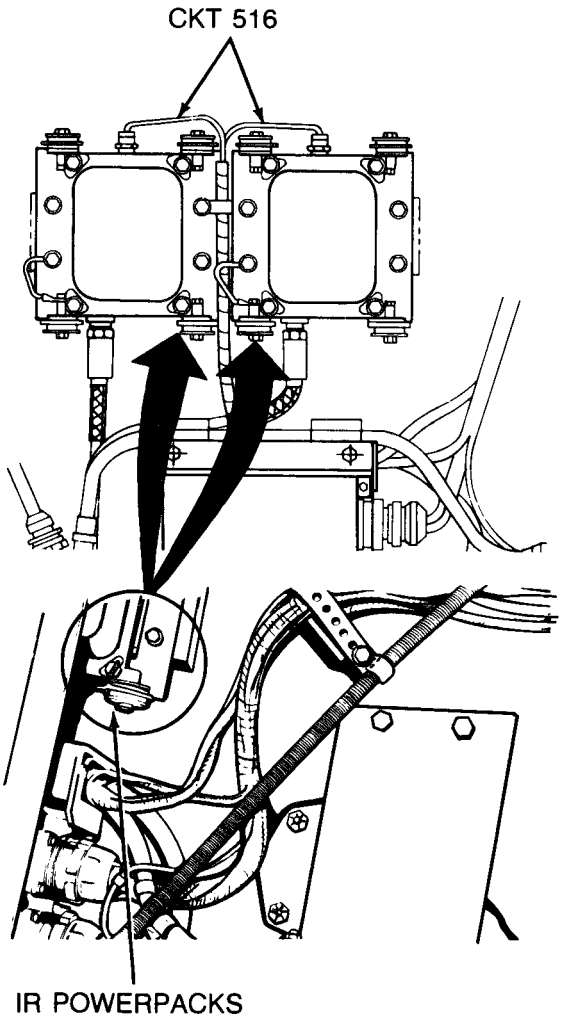
Second Technician (Operator's Station)

- Set NIGHT VISION switch ON.

First Technician (Commander's Station)

- Turn on radio set (TM 5-5420-202-10).
- Listen for static in radio helmet.

Did static stop when first IR powerpack was disconnected?



YES

20

- **Static caused by first IR powerpack - check if static is caused by defective ground strap on IR powerpack.**
- **See Step (22).**

NO

21

- **Static caused by second IR powerpack - check if static is caused by defective ground strap on IR powerpack.**
- **See Step (22).**

TA250426

Symptom-49

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

FROM STEP (20) OR (21)

NOTE

This step is to be performed on the IR powerpack causing static. Procedure is the same for both IR powerpacks.

22 **Check if static is caused by defective ground strap on IR powerpack.**

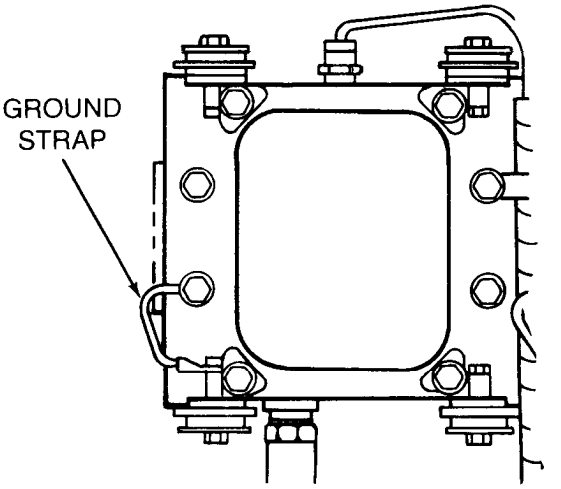
Second Technician (Operator's Station)

- Set NIGHT VISION switch OFF.

First Technician (Commander's Station)

- Turn off radio set (TM 5-5420-202-10).
- Connect front accessory harness connector to IR powerpack.
- Check infrared powerpack for loose ground strap connections or damaged ground strap.

Is ground strap connection loose or ground strap damaged?



INFRARED
POWERPACK
(1 OF 2)

23
- **Clean and tighten loose ground strap connections. If ground strap connection is not loose, replace damaged ground strap (page 10-152).**

YES

NO

24 **Replace infrared powerpack (page 10-152).**

TA250427

Symptom-49

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

FROM STEP (8)

(25) **Check if static is caused by air cleaner blower motors.**

First Technician (Commander's Station)

- Turn off radio set (TM 5-5420-226-10).

First Technician (Top Deck)

- Open top deck grille doors to gain access to left and right air cleaner assemblies.
- Disconnect rear accessory to bulkhead harness connectors (CKT 415B) from the left and right air cleaner assemblies.

Second Technician (Operator's Station)

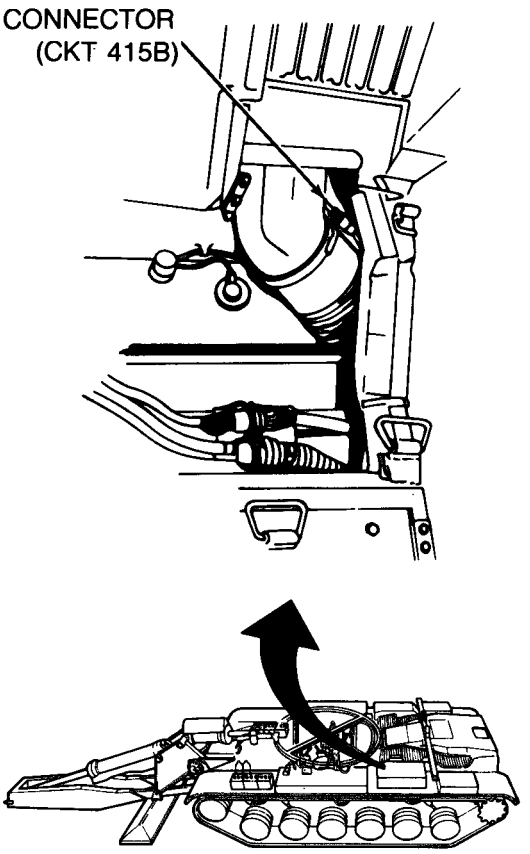
- Start engine.
- Set PERSONNEL HEATER HI/LO switch OFF.

First Technician (Commander's Station)

- Turn on radio set (TM 5-5420-226-10).
- Listen for static in radio helmet.

Did static stop when air cleaner blowers were disconnected (engine running)?

OPEN TOP DECK GRILLE DOORS (LEFT SIDE)



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

NO

YES

(26)
- **Check if static is caused by left air cleaner assembly.**
- **See Step (32).**

TA250428

Symptom-49

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

27 **Check if static is caused by generator.**

Second Technician (Operator's Station)

- Stop engine.

First Technician (Top Deck)

- Reconnect rear accessory to bulkhead harness connectors to left and right air cleaner assemblies.
- Close top deck grille doors.

First Technician (Commander's Station)

- Turn off radio set (TM 5-5420-202-10).

Second Technician (Operator's Station)

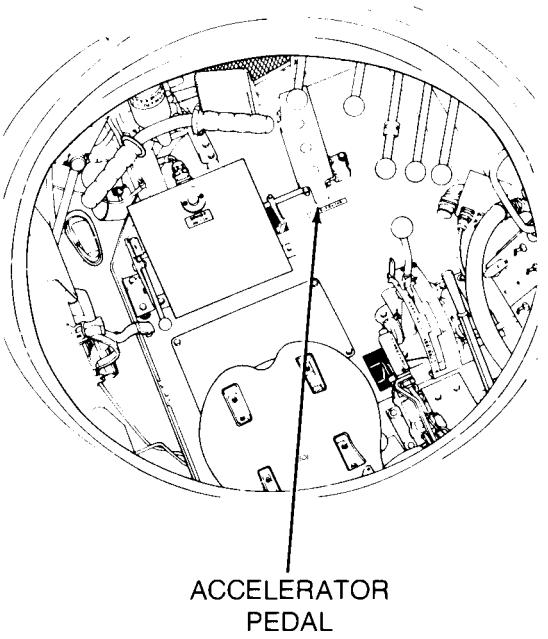
- Start engine.

First Technician (Commander's Station)

- Turn on radio set (TM 5-5420-202-10).
- Listen for static in radio helmet.

Second Technician (Operator's Station)

- Press accelerator pedal for a few seconds and release.



Does static sound like a whining noise that changes with engine speed?

YES

NO

28

- **Turn off radio set (TM 5-5420-202-10).**
- **Stop engine.**
- **Notify support maintenance of EMI problem.**

TA250429

Symptom-49

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

29 **Check if static is caused by defective ground strap on generator.**

First Technician (Commander's Station)

- Turn off radio set (TM 5-5420-202-10).

Second Technician (Operator's Station)

- Stop engine.

Both Technicians (Top Deck)

- Have powerplant removed (page 5-2).

First Technician (Powerplant, Generator Side)

- Check generator for loose ground strap connections or damaged ground strap.

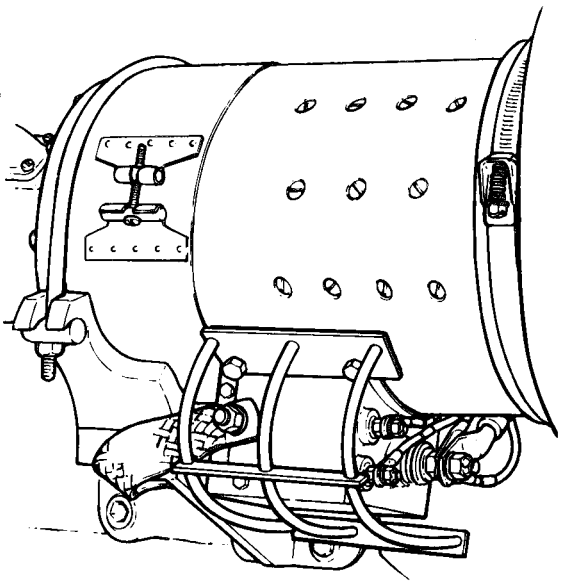
Are ground strap connections loose or ground strap damaged?

30 **Replace generator (page 10-6).**

NO

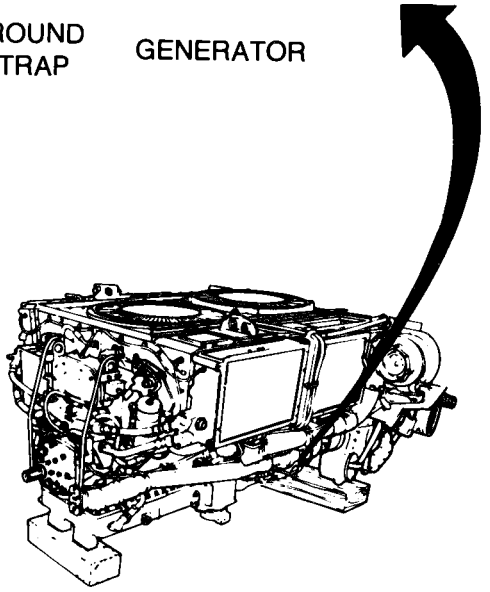
31 **Clean and tighten loose ground strap connection. If ground strap connections are not loose, replace damaged ground straps.**

YES



GROUND STRAP

GENERATOR



POWERPLANT

TA250430

Symptom-49

FROM STEP (26)

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

(32) Check if static is caused by left air cleaner assembly.

First Technician (Commander's Station)

- Turn off radio set (TM 5-5420-202-10).

Second Technician (Operator's Station)

- Stop engine.

First Technician (Top Deck Grille Doors)

- Connect connector (CKT 415B) at left air cleaner assembly.

Second Technician (Operator's Station)

- Start engine.

First Technician (Commander's Station)

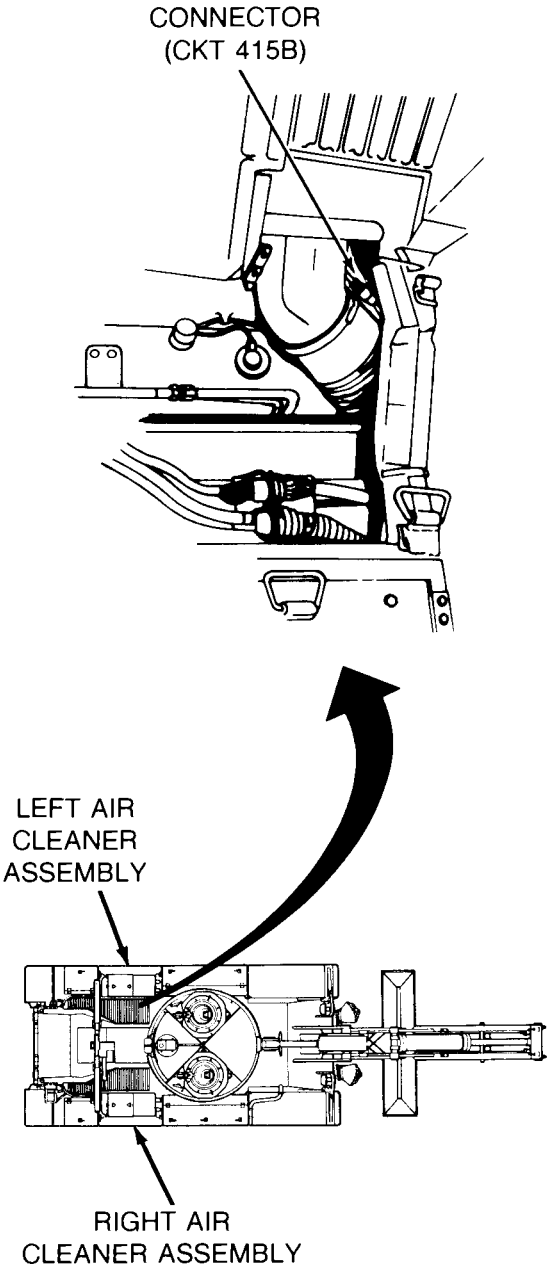
- Turn on radio set (TM 5-5420-202-10).
- Listen for static in radio helmet.
- Turn off radio set (TM 5-5420-202-10).

Second Technician (Operator's Station)

- Stop engine.

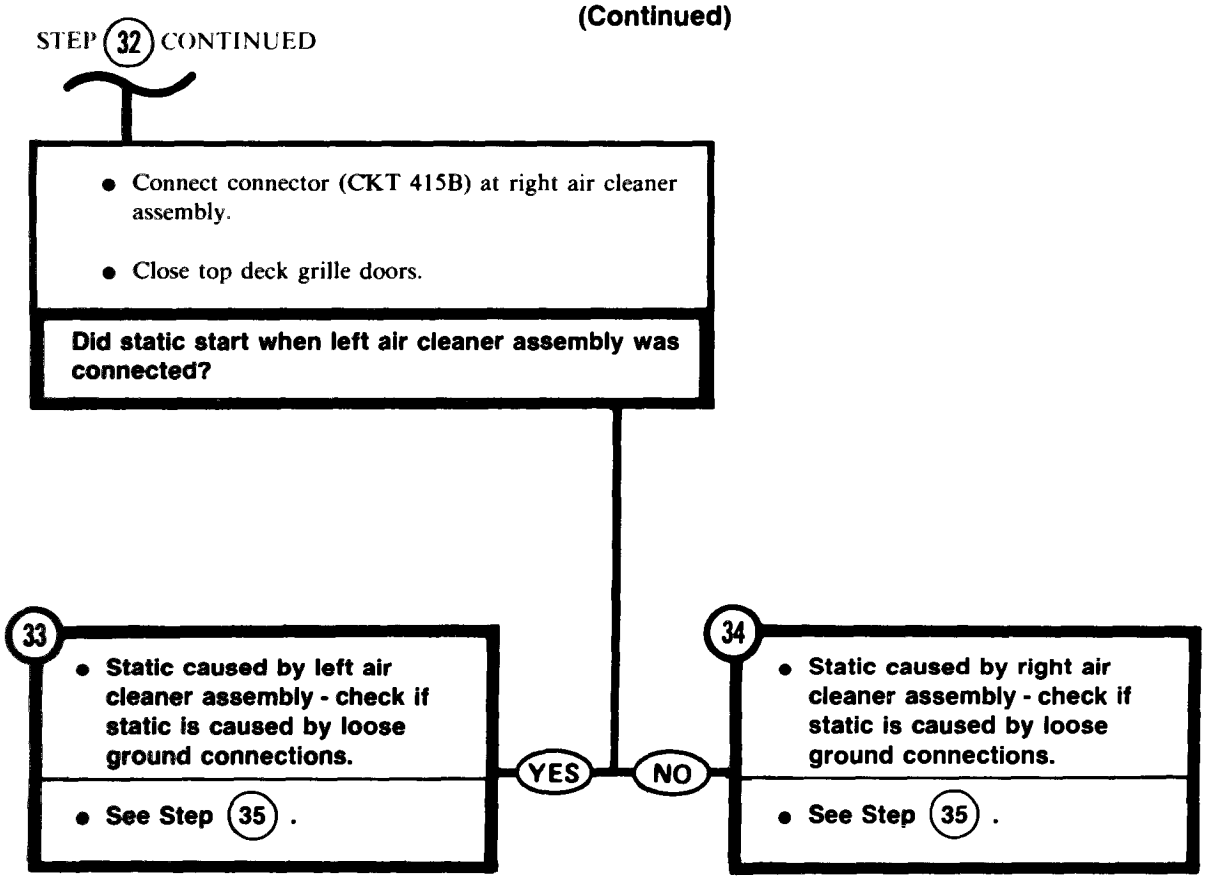
First Technician (Top Deck Grille Doors, Right Side)

OPEN TOP DECK GRILLE DOORS (LEFT SIDE)



TA250431

Symptom-49 **DETAILED TROUBLESHOOTING PROCEDURE**
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)



TA250432

Symptom-49

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

FROM STEP (33) or (34)

NOTE

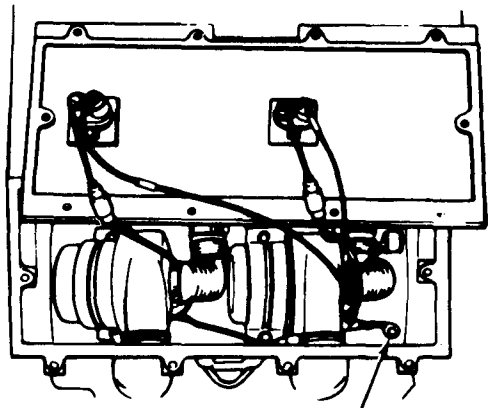
This step is to be performed on the air cleaner assembly causing static. Electrical connections are the same on both left and right air cleaner assemblies.

35 Check if static is caused by loose ground connection.

First Technician (Air Cleaner Assembly Causing Static)

- Remove cover from air cleaner housing (page 7-98).
- Check if ground connection is loose.

Is ground connection loose?

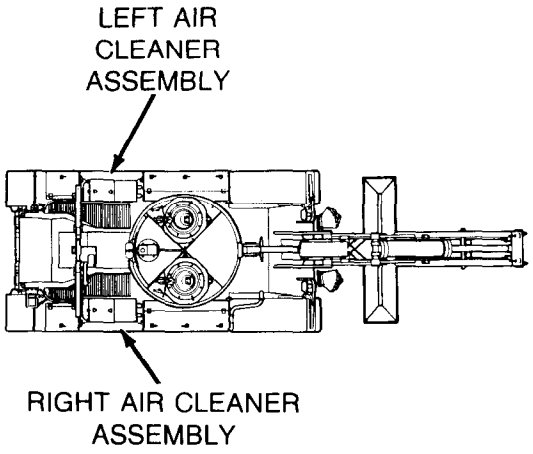


YES

36

- **Clean and tighten loose ground connection.**
- **Install air cleaner housing cover (page 7-100).**

NO



TA250433

Symptom-49

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

37 **Check if static is caused by left air cleaner centrifugal fan motor.**

First Technician (Air Cleaner Assembly Causing Static)

- Disconnect fan motor power jumper lead connector (left side).

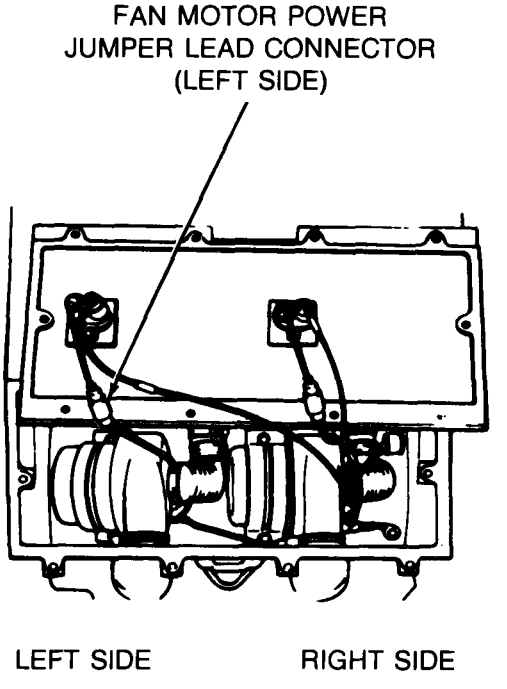
Second Technician (Operator's Station)

- Start engine.

First Technician (Commander's Station)

- Turn on radio set (TM 5-5420-202-10).
- Listen for static in radio helmet.

Did static stop when left air cleaner centrifugal fan motor was disconnected?



YES

38

- **Replace air cleaner centrifugal fan motor (left side) (page 7-102).**
- **Turn off radio set.**

NO

39

- **Replace air cleaner centrifugal fan motor (right side) (page 7-102).**
- **Turn off radio set.**

TA250434

Symptom-49

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

FROM STEP (10)

(40) Check if static is caused by personnel heater fuel pump.

First Technician (Front of Crew Compartment)

- Disconnect heater to basket disconnect harness connector from personnel heater fuel pump (CKT 402).

Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch ON-LO.

First Technician (Commander's Station)

- Turn on radio set (TM 5-5420-202-10).
- Listen for static in radio helmet.

Did static stop when personnel heater fuel pump was disconnected?

NO

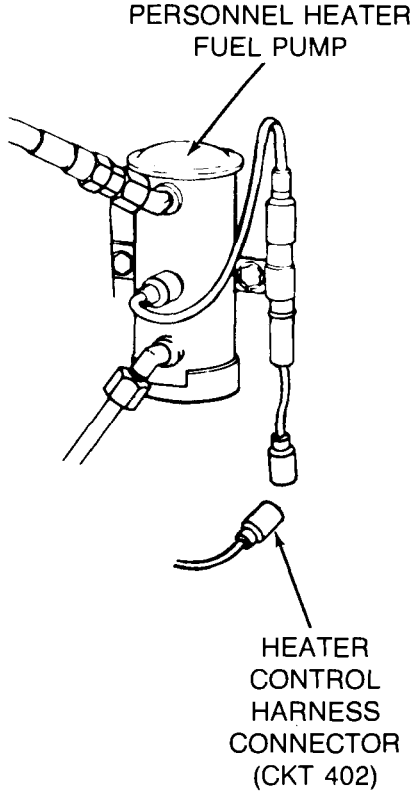
(41)

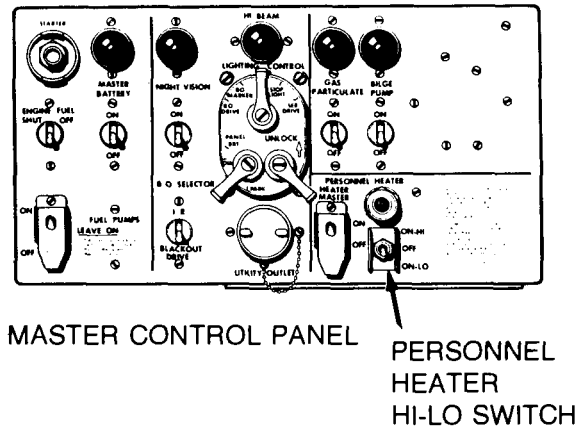
- **Connect heater control harness (CKT 402) at fuel pump.**
- **Replace personnel heater (page 18-2).**
- **Turn off radio set.**

YES

(42)

- **Replace personnel heater fuel pump (page 18-23).**
- **Turn off radio set.**





TA250435

Symptom-49

FROM STEP (12)

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - COMMUNICATIONS
(Continued)

(43) Check if static is caused by right fuel tank electrical fuel pump.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Turn off radio set (TM 5-5420-202-10).
- Remove right-hand floor access cover (page 17-7).
- Remove access cover for right fuel pump radio interference suppression capacitor and housing assembly (page 10-316).
- Disconnect electrical connector from capacitor and housing assembly.

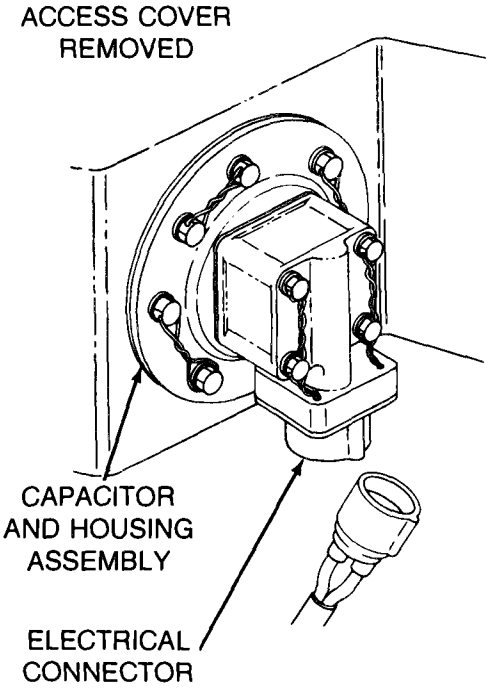
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Turn on radio set (TM 5-5420-202-10).
- Listen for static in radio helmet.

Did static stop when right fuel tank electrical fuel pump was disconnected?



YES

(44)

- **Turn off radio set (TM 5-5420 202-10).**
- **Replace right fuel tank fuel pump radio interference suppression capacitor and housing assembly (page 10-316).**

NO

(45)

- **Connect electrical connector to capacitor and housing assembly.**
- **Install capacitor and housing assembly access cover.**
- **Install floor access cover (page 17-7).**
- **Turn off radio set (TM 5-5420-202-10).**
- **Replace left fuel tank fuel pump radio interference suppression capacitor and housing assembly (page 10-326).**

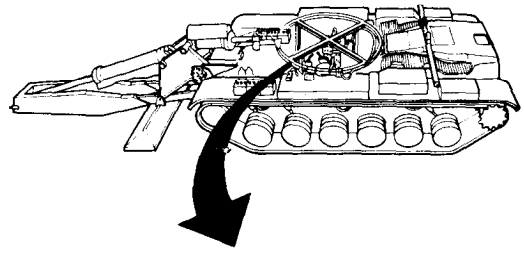
TA250436

Symptom-50

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - DRAIN VALVES

FRONT HULL DRAIN VALVE WILL NOT WORK.

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

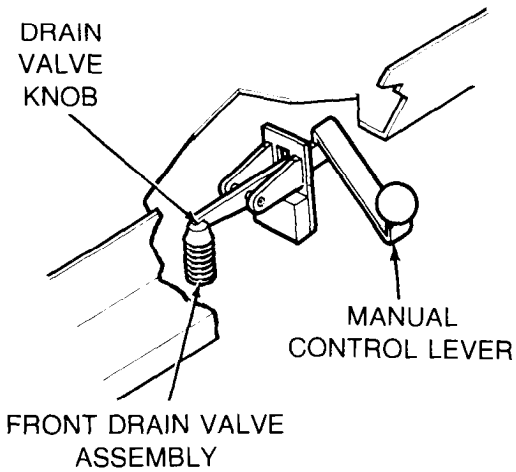


1 Check front drain valve and valve cage for binding or obstruction.

Technician (Front of Crew Compartment)

- Press down on front drain valve knob with thumbs and release.
- Repeat above step 3 or 4 times.
- Check if valve moves freely between CLOSED and OPEN positions and returns to CLOSED position when released.
- Check if valve is not obstructed from closing by foreign matter in valve.

Is valve binding or obstructed?



YES

2
- **Remove, clean, and inspect front drain valve assembly (page 17-18).**

NO

3
- **Remove control lever (page 17-18).**
- **Clean control lever if rusted or corroded.**
- **Replace control lever if damaged (page 17-18).**

TA250437

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - DRAIN VALVES

Symptom-51

REAR DRAIN VALVE WILL NOT WORK.

NOTE

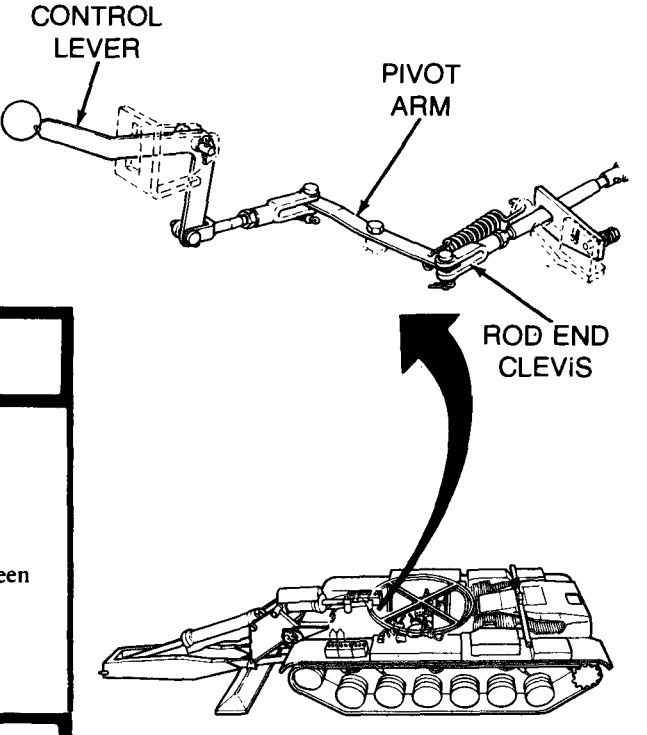
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check engine compartment drain valve control lever for binding.

Second Technician (Front of Crew Compartment)

- Disconnect rod end clevis from pivot arm (page 17-32).
- Operate rear hull drain valve control lever between OPEN and CLOSE positions.
- Check control lever and bracket for binding or obstruction.

Is drain valve control handle binding or obstructed?



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

2 Remove, disassemble and inspect rear drain valve control lever assembly (page 17-57).

YES

NO

TA250438

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - DRAIN VALVES
(Continued)

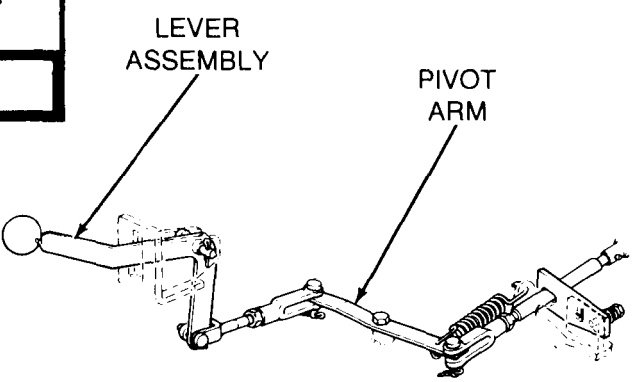
Symptom-51

3 **Check rear drain valve control lever and pivot arm for damaged or missing parts.**

Second Technician (Front of Crew Compartment)

- Visually check lever assembly for damaged or missing parts.
- Visually check pivot arm for damaged or missing parts.

Are any parts missing or damaged?



NO

YES

4
- **Replace damaged or missing parts.**
- **Reconnect rod end clevis to pivot arm.**

TA250439

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - DRAIN VALVES
(Continued)

Symptom-51

5 **Check rear drain valve connecting rods for obstructions.**

Second Technician (Front of Crew Compartment)

- Connect rod end clevis to pivot arm (page 17-36).

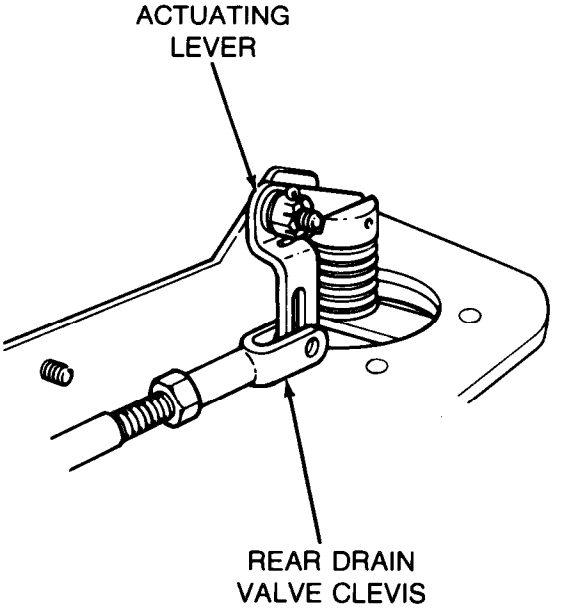
First Technician (Engine Compartment)

- Disconnect rear drain valve clevis from actuating lever (page 17-48).

Second Technician (Front of Crew Compartment)

- Move valve control lever between OPEN and CLOSE positions and check for binding or obstruction.

Is connecting rod obstructed?



NO

YES

6 **Notify support maintenance of binding or obstructed rear drain connecting rod.**

TA250440

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - DRAIN VALVES
(Continued)

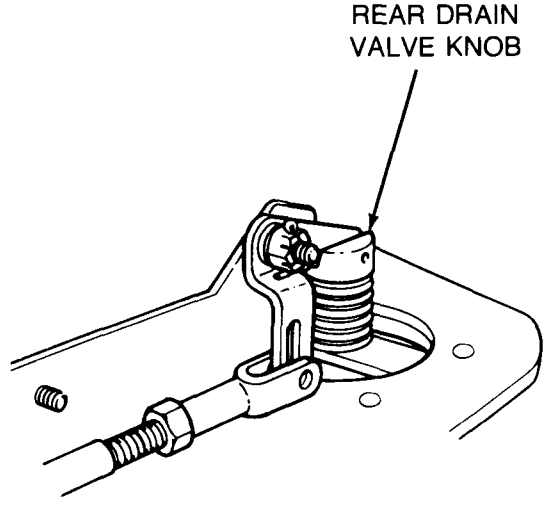
Symptom-51

7 **Check that rear drain valve will open and close.**

First Technician (Engine Compartment)

- Press down rear drain valve knob with thumbs and release.
- Repeat two or three times and check if rear drain valve is moving freely.

Will rear drain valve open and close?



YES

NO

8 **Remove, disassemble and inspect the rear drain valve assembly (page 17-60).**

TA250441

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - DRAIN VALVES
(Continued)

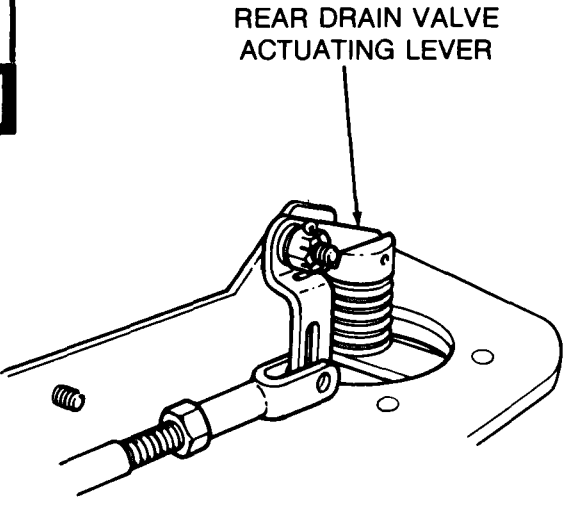
Symptom-51

9 **Check that rear drain valve actuating lever is not obstructed.**

First Technician (Engine Compartment)

- Operate rear drain valve by moving actuating lever by hand.
- Check if actuating lever moves freely.

Is actuating lever binding or obstructed?



10 **Remove, disassemble and inspect rear drain valve actuating lever (page 17-57).**

NO

11 **Perform rear drain valve linkage adjustment (page 17-65).**

YES

TA250442

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS

Symptom-52

FIXED FIRE EXTINGUISHER FAILS TO OPERATE WHEN FIRE PULL HARD HANDLE IS PULLED

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

NOTE

Two different control valves have been used on the fire extinguisher. Although different in appearance check out is identical.

1 Check interior release mechanism for binding in first shot cycle.

First Technician (Operator's Station)

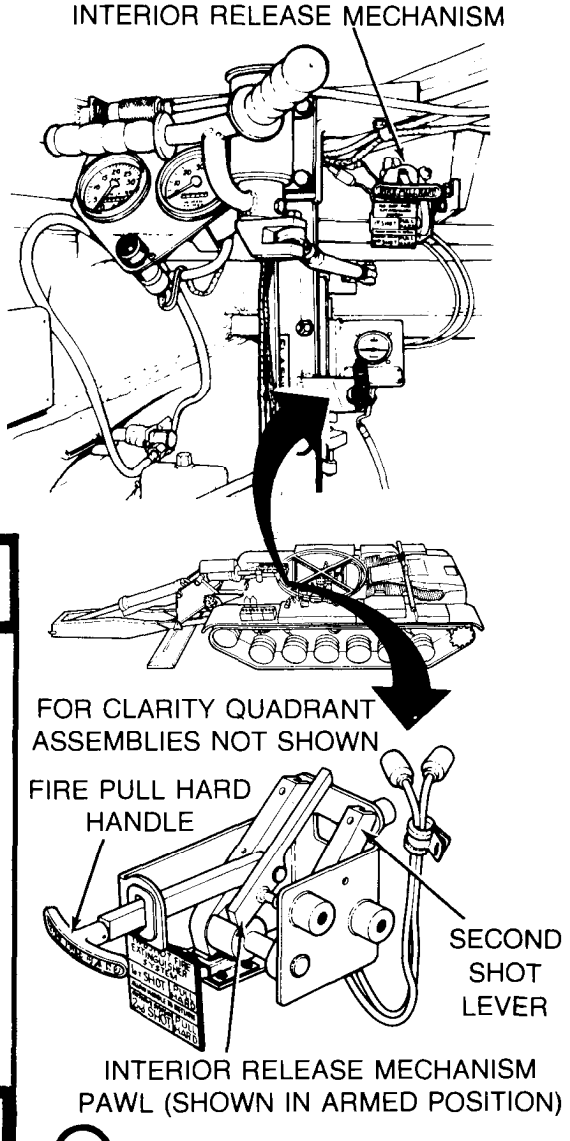
- Remove interior release mechanism (page 20-23).
- Arm release mechanism if not armed for first shot, by pulling FIRE PULL HARD handle all the way out, holding pawl down and pushing handle all the way in.
- Pull interior FIRE PULL HARD handle and observe action of interior release mechanism, pawl should go into the vertical position. Hold second shot lever to make sure it does not move.
- Push FIRE PULL HARD handle in all the way.

Did first shot mechanism work freely without binding?

YES

NO

2 Repair interior releas mechanism (page 20-28).



TA250443

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)

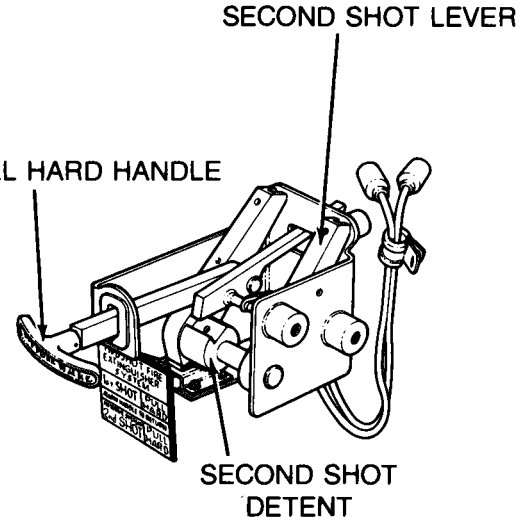
Symptom-52

3 **Check interior release mechanism for binding in second shot position.**

First Technician (Operator's Station)

- Check if mechanism is ready for second shot with bottom part of pawl in second shot detent.
- Pull FIRE PULL HARD handle and observe action of second shot mechanism, second shot lever should move as handle is pulled.

Did second shot mechanism work freely without binding?



INTERIOR RELEASE MECHANISM

YES

NO

4 **Repair interior release mechanism (page 20-28).**

TA250444

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)

Symptom-52

5 **Check first shot control valve for extension of pin by using handle on control valve.**

First Technician (Operator's Station)

NOTE

Do not install lead seals on interior release mechanism at this time.

- Install interior release mechanism (page 20-25).

Second Technician (Front of Crew Compartment)

- Disconnect both control valves (page 20-2).
- Return first shot control valve to SET position, if not in SET position, by aligning arrow on shaft with arrow on control valve.
- Remove safety pin and rotate handle on valve clockwise until it stops.
- Observe pin at the bottom of the valve for extension of 1/8 inch (.3175 cm).

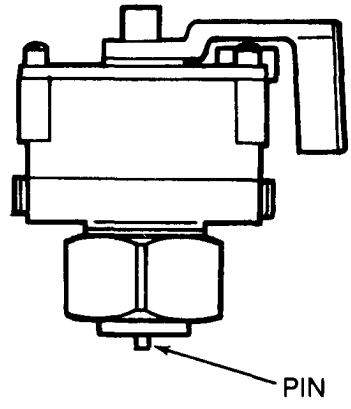
Did the valve operate freely and extend the pin?

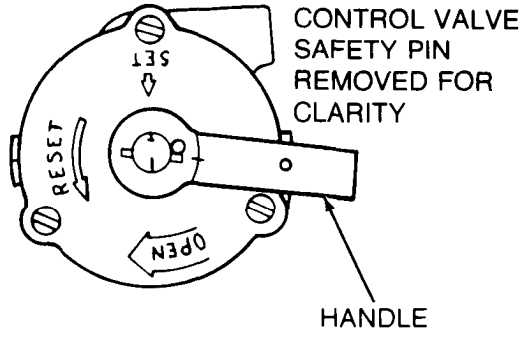
6

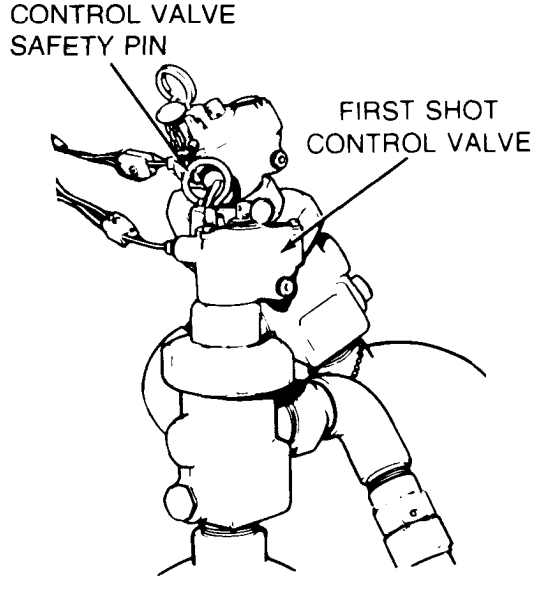
- **Repair first shot control valve (page 20-50).**
- **Install safety wire and lead seal on interior release**

NO

YES







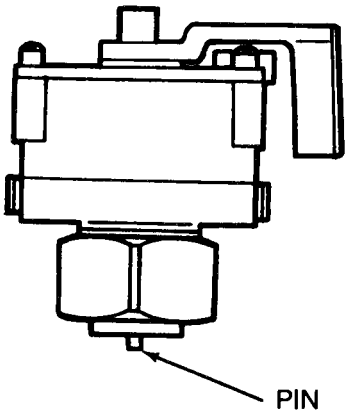
TA250445

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)

Symptom-52

CAUTION

Do not engage control valve mounting nut to cylinder while doing this check.



7 **Check operation of first shot control valve when FIRE PULL HARD handle is pulled.**

Second Technician (Front of Crew Compartment)

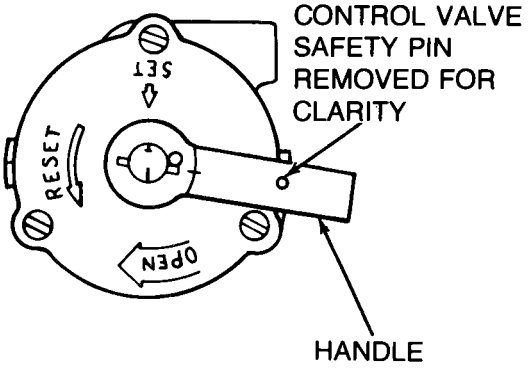
- Return first shot control valve to set position.
- Hold control valve away from and above first shot cylinder.

First Technician (Operator's Station)

- Pull FIRE PULL HARD handle.

Second Technician (Front of Crew Compartment)

- Check if pin in control valve did extend.

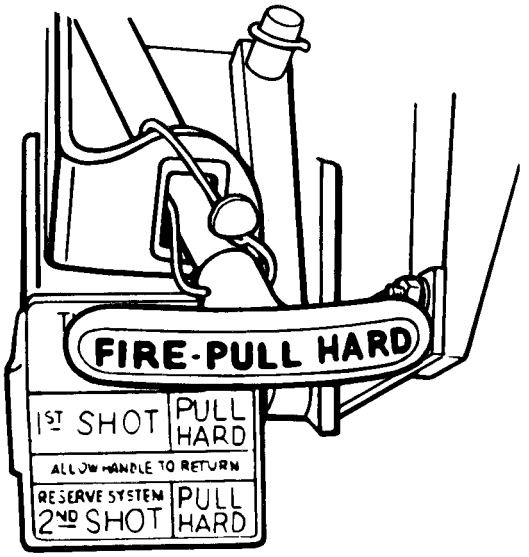


Did pin in control valve extend?

NO

8
- **Replace first shot control cable between interior release mechanism and control valve (page 20-16).**
- **Install safety wire and lead seal on interior release mechanism**

YES



TA250446

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)

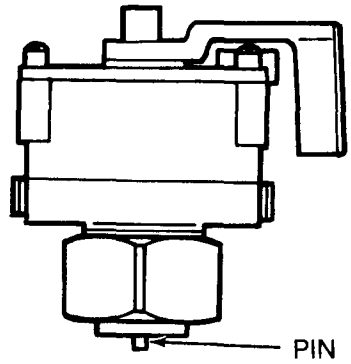
Symptom-52

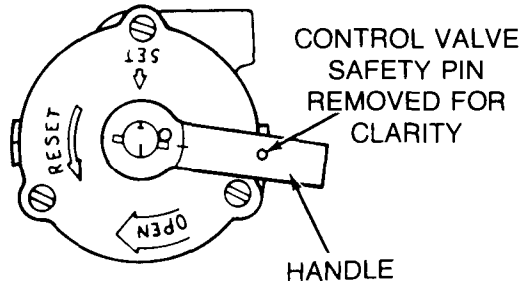
9 **Check second shot control valve for extension of pin when control valve handle is turned.**

Second Technician (Front of Crew Compartment)

- Return second shot control valve to SET position, if not in SET position.
- Remove control valve safety pin and turn handle on valve clockwise until it stops.
- Check if pin on bottom of control valve extends 1/8 inch (.3175 cm).

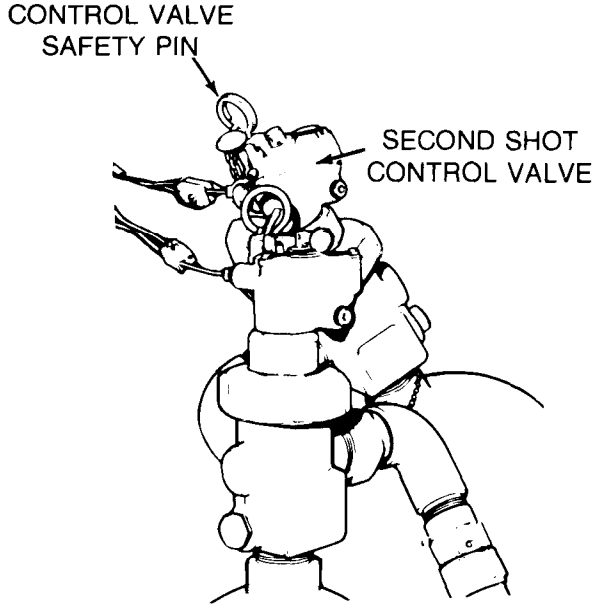
Did control valve operate freely and extend the pin 1/8 inch (.3175 cm)?





NO

10
- ***Repair second shot control valve (page 20-50).***
- **Install safety wire and lead seal on interior release mechanism.**



YES

TA250447

Symptom-52

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)

CAUTION

Do not engage control valve mounting nut to cylinder while doing this check.

11 **Check operation of second shot control valve when FIRE PULL HARD handle is pulled.**

Second Technician (Front of Crew Compartment)

- Return second shot control valve to set position.
- Hold control valve in position above second shot cylinder.

First Technician (Operator's Station)

- Pull FIRE PULL HARD handle.

Second Technician (Front of Crew Compartment)

- Check if pin in control valve did extend.
- Return first and second shot control valves to SET position.

First Technician (Operator's Station)

- Arm release mechanism for first shot.

Did pin in the control valve extend?

YES

13
- **Replace fire extinguisher cylinders (page 20-52).**
- **Install safety wire and lead seals on interior release mechanism**
- **Install safety wire and lead seals on first shot and second shot control valves**

NO

12 **Replace second shot cable between FIRE PULL HARD handle and control valve (page 20-16).**

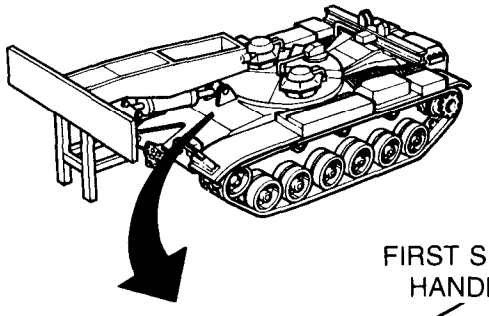
TA250448

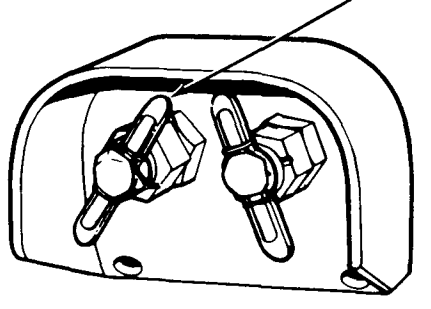
Symptom-53 **DETAILED TROUBLESHOOTING PROCEDURE**
SUPPORT SYSTEM - FIRE EXTINGUISHERS

FIXED FIRE EXTINGUISHER FAILS TO OPERATE WHEN EXTERIOR FIRST SHOT OR SECOND SHOT HANDLES ARE PULLED.

NOTE
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

NOTE
Two different control valves have been used on the fire extinguisher. Although different in appearance check out is identical.





1 **Check if second shot handle was pulled.**

Second Technician (Front of Vehicle)

- Visually check second shot handle for broken safety seal.

Was second shot handle pulled?

NO — **2** **See Step (12).**

YES

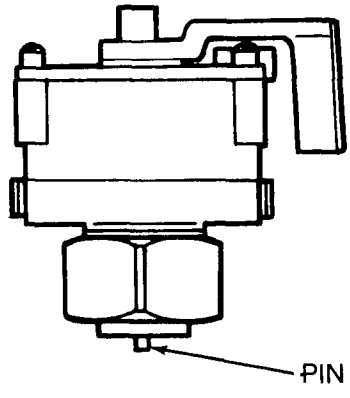
3 **Check first shot exterior handle for operation.**

First Technician (Front of Crew Compartment)

- Disconnect first shot control valve (page 20-2).
- Hold control valve away from and above first shot cylinder.

Second Technician (Front of Vehicle)

- Pull first shot exterior handle.
- Check if first shot handle operates freely.



Did first shot exterior handle operate freely?

YES

NO — **4** **Replace cable between first shot exterior handle and first shot control valve (page 20-16).**

TA250449

Symptom-53

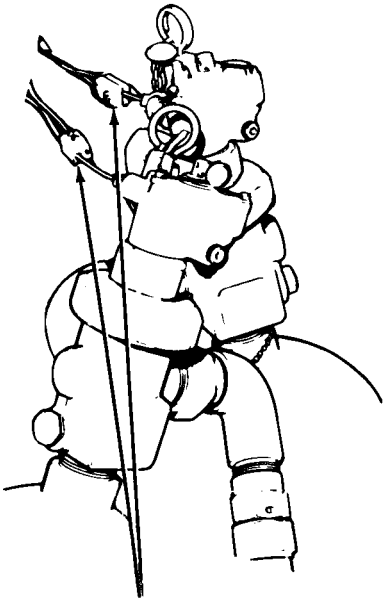
DETAILED TROUBLESHOOTING PROCEDURE SUPPORT SYSTEM - FIRE EXTINGUISHERS (Continued)

5 **Check first shot exterior cable connections at control valve for tightness.**

First Technician (Front of Crew Compartment)

- Hold control valve and pull hard on cables and cable connections to see if they are loose.

Are cable connections loose?



EXTERIOR CONTROL CABLE CONNECTIONS

NO

YES

6

- **Tighten cable connections.**
- **Install safety wire and lead seals on control valve (page C-38).**
- **Install safety wire and lead seal on first shot exterior handle.**

TA250450

Symptom-53

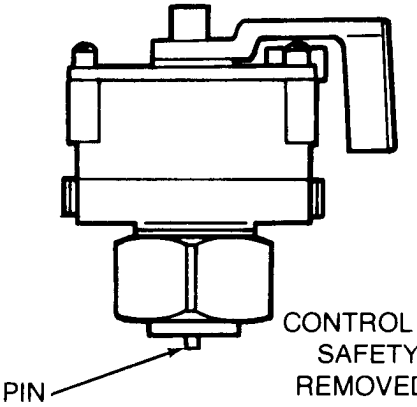
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)

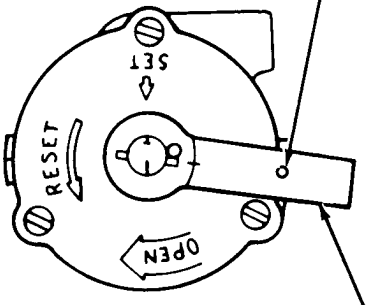
7 **Check first shot control valve for extension of pin by using handle on control valve.**

First Technician (Front Crew Compartment)

- Return first shot control valve to SET position.
- Remove safety pin and rotate handle on valve clockwise until it stops.
- Observe pin at the bottom of the valve for extension of 1/8 inch (.3175 cm).

Did the valve operate freely and extend the pin?



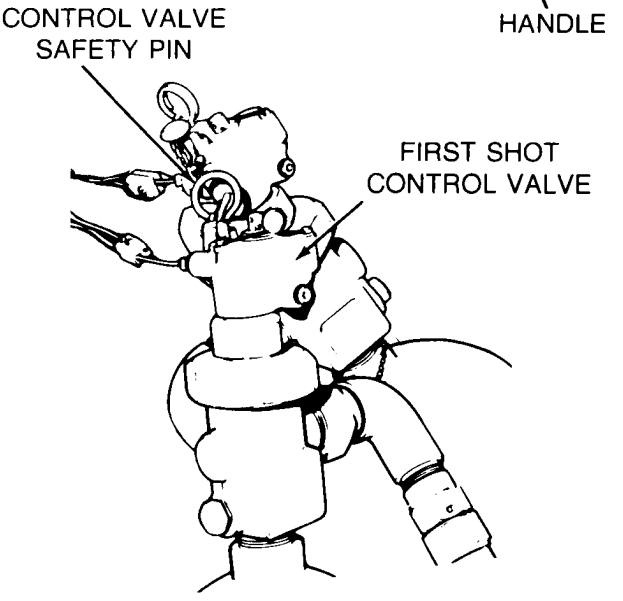


8

- **Repair first shot control valve (page 20-50).**
- **Install safety wire and lead seal on first shot exterior handle.**

NO

YES



TA250451

Symptom-53

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)

CAUTION

Do not engage control valve mounting nut to cylinder while doing this check.

9 **Check operation of first shot control valve when exterior first shot handle is pulled.**

First Technician (Front of Crew Compartment)

- Return first shot control valve to set position.
- Hold control valve away from and above first shot cylinder.

Second Technician (Front of Vehicle)

- Pull first shot exterior handle.

First Technician (Front of Crew Compartment)

- Check if pin in control valve did extend.

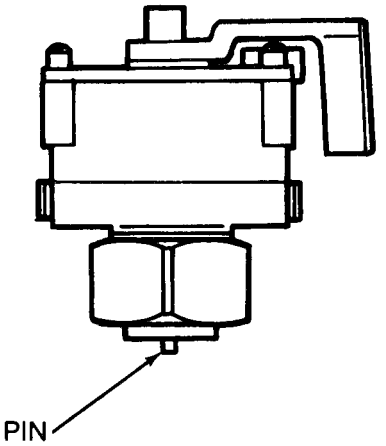
Did pin in control valve extend?

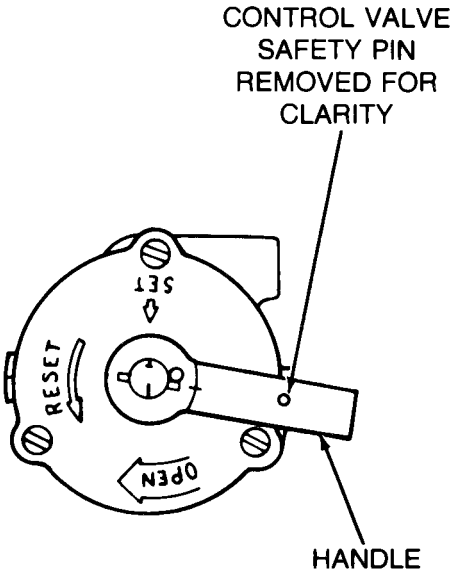
10
- **Repair first shot control valve (page 20-50).**
- **Install safety wire and lead seals on first shot exterior handle.**

NO

11
- **Replace fire extinguisher cylinder (page 20-52).**
- **Install safety wire and lead seal on first shot exterior handle.**
- **Install safety wire and lead seals on first shot control valve.**

YES





TA250452

Symptom-53

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)

FROM STEP 2

12 Check second shot exterior handle for operation.

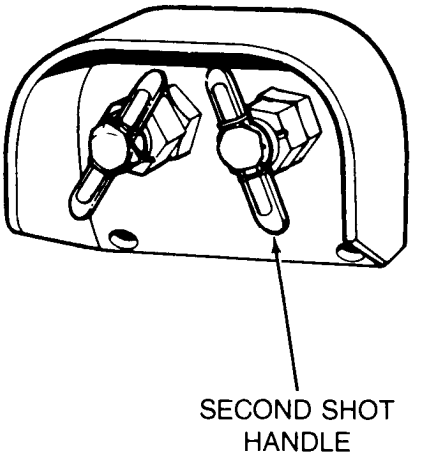
First Technician (Front of Crew Compartment)

- Disconnect second shot control valve (page 20-2).
- Hold control valve away from and above second shot cylinder.

Second Technician (Front of Vehicle)

- Pull second shot exterior handle.
- Check if second shot exterior handle operates freely.

Did second shot exterior handle operate freely?



YES

NO

13 Replace cables between second shot exterior handle and second shot control valves (page 20-16).

TA250453

Symptom-53

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)

14 **Check second shot exterior cable connections at control valve for tightness.**

First Technician (Front of Crew Compartment)

- Hold control valve and pull hard on cables and cable connections to see if they are loose.

Are cable connections loose?

EXTERIOR CONTROL CABLE CONNECTIONS

NO

YES

15

- **Tighten cable connections.**
- **Install safety wire and lead seals on control valve (page C-38).**
- **Install safety wire and lead seal on second shot exterior handle.**

TA250454

Symptom-53

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHERS
(Continued)

16 **Check second shot control valve for extension of pin by using handle on control valve.**

First Technician (Front of Crew Compartment)

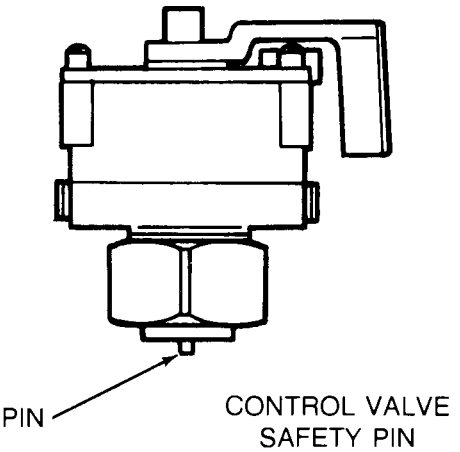
- Return second shot control valve to SET position.
- Remove safety pin and rotate handle on valve clockwise until it stops.
- Observe pin at the bottom of the valve for extension of 1/8 inch.

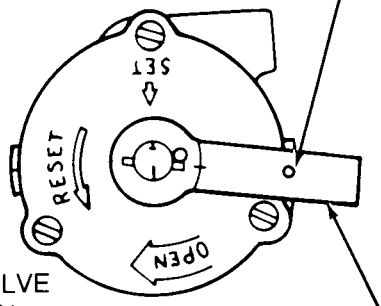
Did the valve operate freely and extend the pin?

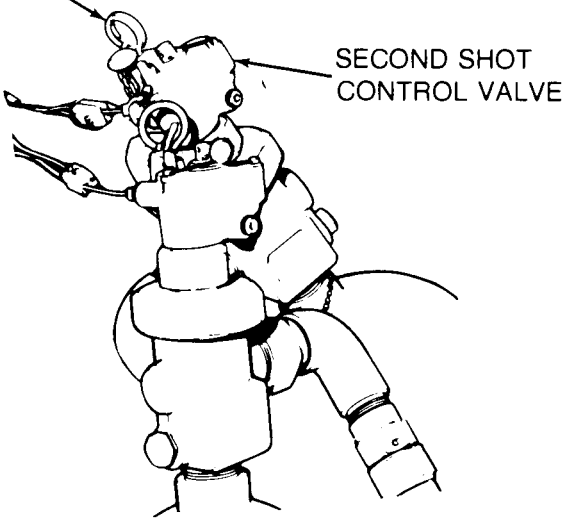
NO

17
- **Repair second shot control valve (page 20-50).**
- **Install safety wire and lead seal on second shot exterior handle.**

YES







TA250455

Symptom-53

DETAILED TROUBLESHOOTING PROCEDURE SUPPORT SYSTEM - FIRE EXTINGUISHERS (Continued)

CAUTION

Do not engage control valve mounting nut to cylinder while doing this check.

18 **Check operation of second shot control valve when exterior second shot handle is pulled.**

First Technician (Front of Crew Compartment)

- Return second shot control valve to SET position.
- Hold valve away from and above second shot cylinders.

Second Technician (Front of Vehicle)

- Pull second shot exterior handle.

First Technician (Front of Crew Compartment)

- Check if pins in control valves did extend.

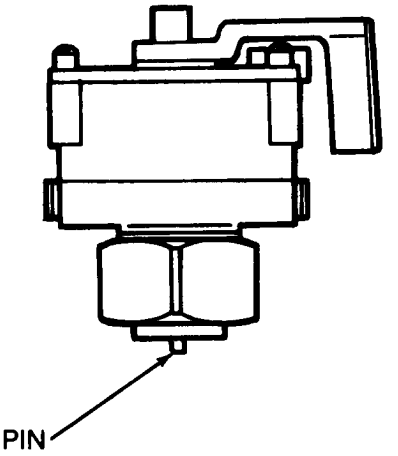
Did pins in control valves extend?

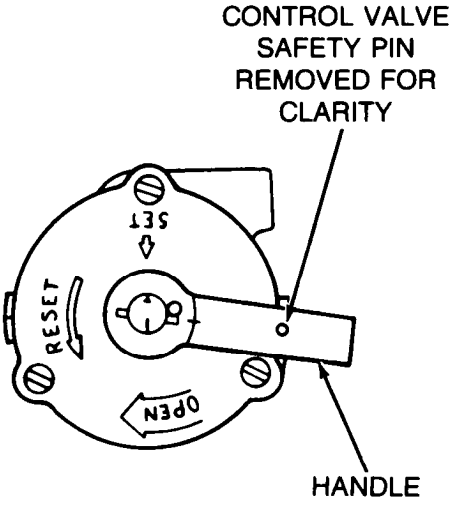
19
- **Repair second shot control valve (page 20-50).**
- **Install safety wire and lead seal on second shot exterior handle.**

NO

20
- **Replace fire extinguisher cylinder (page 20-52).**
- **Install safety wire and lead seal on second shot exterior handle.**
- **Install safety wire and lead seal on second shot control valve.**

YES





TA250456

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER

Symptom-54

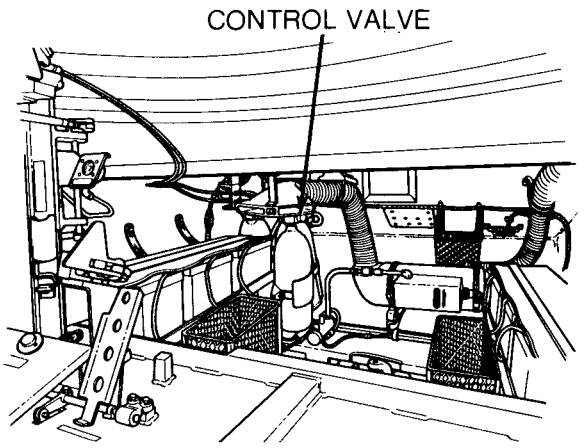
ENGINE DOES NOT STOP RUNNING WHEN FIRE PULL HARD HANDLE IS PULLED (ENGINE FUEL SHUT OFF SWITCH ON MASTER CONTROL PANEL WILL WORK).

CAUTION

The control valve on each of three fire extinguisher cylinders must be removed to avoid firing system.

NOTE

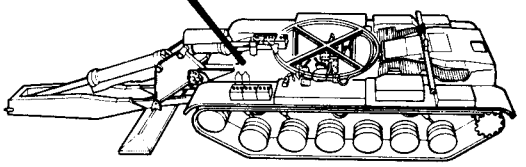
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



1 **Listen for fire extinguisher relay to work when FIRE-PULL HARD interior control handle is pulled.**

Second Technician (Front of Crew Compartment)

- Remove control valves from each of three fire extinguisher cylinders (page 20-2).



TA250457

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER
(Continued)

Symptom-54

STEP (1) CONTINUED

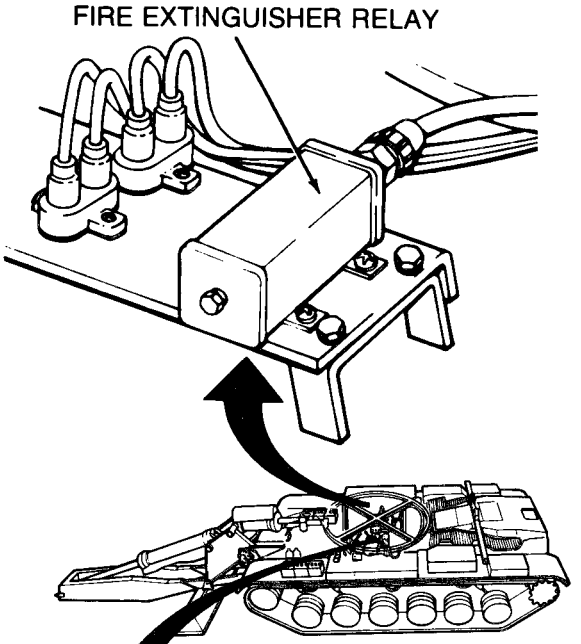
First Technician (Commander's Station)

- Remove right-hand floor access cover (page 17-7).
- Listen for click sound from fire extinguisher relay when FIRE-PULL HARD interior control handle is pulled and another click 10 seconds later.

Second Technician (Operator's Station)

- Pull FIRE-PULL HARD interior control handle and release it.

Did relay close and stay closed for a minimum of 10 seconds?



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

FIRE EXTINGUISHER INTERIOR CONTROL HANDLE

NO

YES

(2)

- **Check front accessory harness (CKT 975A, 54A) for continuity from bulkhead connector to connector at fire extinguisher relay.**

- **See Step (10) .**

TA250458

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER
(Continued)

Symptom-54

3 **Check front accessory harness (CKT 975) at fire extinguisher relay for electrical power.**

Second Technician (Front of Crew Compartment)

WARNING

When disconnected, do not allow battery ground straps to come into contact with any metal surface.

- Disconnect three battery ground straps (page 10-268).

First Technician (Commander's Station)

WARNING

Use extreme care when working with circuit 975. This circuit carries battery voltage at all times whether MASTER BATTERY switch is ON or OFF.

- Disconnect front accessory harness connector from fire extinguisher relay.
- Connect battery ground straps (page 10-268).
- Connect red probe of meter to contact B (CKT 975) at front accessory harness connector for fire extinguisher relay and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

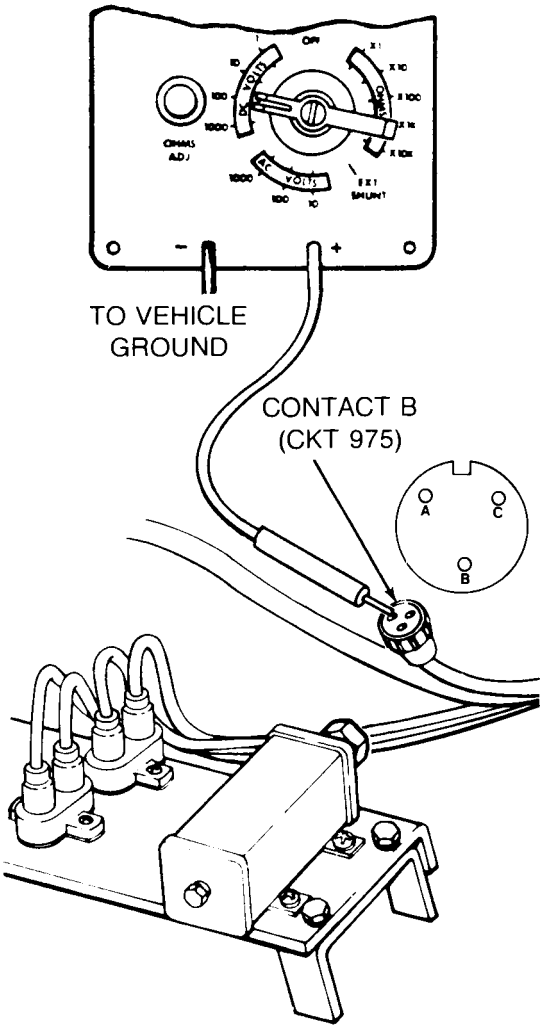
Does meter indicate 18 to 30 volts dc?

YES

NO

4 **• Check fire extinguisher relay circuit breaker for continuity.**

See Step (13) .



TA250459

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER
(Continued)

Symptom-54

5 **Check contact C (CKT 975) of front accessory harness connector at fire extinguisher relay for electrical power.**

First Technician (Commander's Station)

WARNING

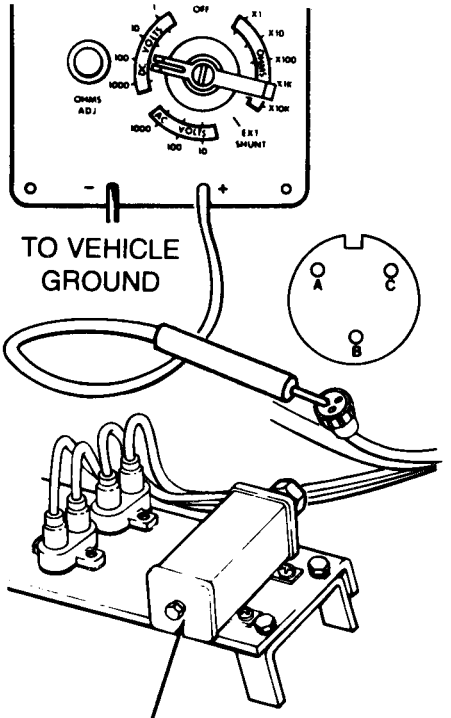
Use extreme care when working with circuit 975. This circuit carries battery voltage at all times whether MASTER BATTERY switch is ON or OFF.

- Connect red probe of meter to contact C (CKT 975) at front accessory harness connector for fire extinguisher relay and black probe to ground.
- Check if meter indicates 18 to 30 volts dc when FIRE-PULL HARD interior control handle is pulled.

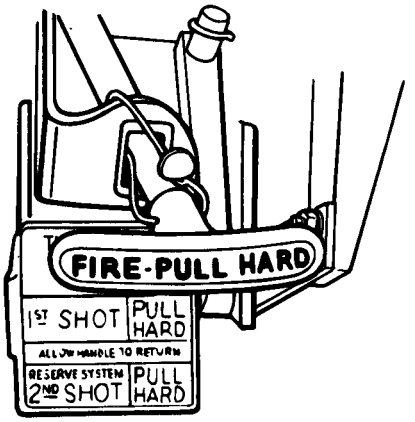
Second Technician (Operator's Station)

- Slowly pull FIRE-PULL HARD interior control handle to close microswitch located in handle release mechanism.

Does meter indicate 18 to 30 volts dc?



FIRE EXTINGUISHER RELAY



NO

YES

6 **Replace fire extinguisher relay (page 10-158).**

TA250460

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER
(Continued)

Symptom-54

7 **Check fire extinguisher fuel shut off switch for continuity.**

Second Technician (Front of Crew Compartment)

WARNING

When disconnected, do not allow battery ground straps to come into contact with any metal surface.

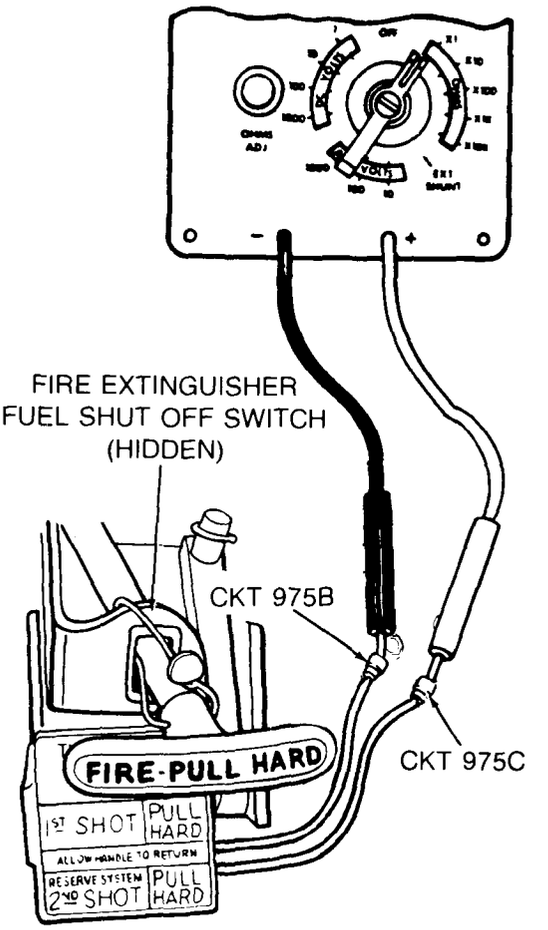
- Disconnect three battery ground straps (page 10-268).

First Technician (Commander's Station)

- Connect front accessory harness connector to fire extinguisher relay.

Second Technician (Operator's Station)

- Disconnect two connectors (CKT 975) from fire extinguisher fuel shut off switch leads.
- Set meter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect probes of meter to contacts of switch leads.



TA250461

Symptom-54

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER
(Continued)

STEP (7) CONTINUED

- Slowly pull FIRE-PULL HARD interior control handle to close microswitch located in handle release mechanism.
- Check if meter indicates continuity when fire extinguisher handle is pulled.

Does meter indicate continuity?

NO

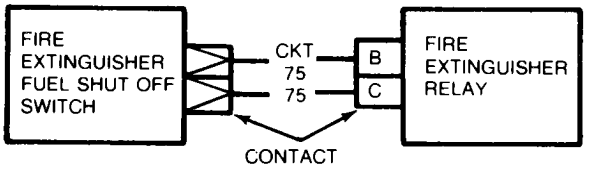
8

- **Adjust FIRE PULL HARD handle to close mircoswitch (page 20-39).**
- **If this does not correct the problem, replace switch (page 20-29).**

YES

9

- **Inspect front accessory harness for bent or broken connector contacts or loose CKT 975 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of bad front accessory harness.**
- **Connect two connectors (CKT 975) to fire extinguisher fuel shutoff switch leads.**
- **Connect three battery ground straps (page 10-268).**



TA250462

Symptom-54

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER
(Continued)

FROM STEP (2)

10 **Check front accessory harness (CKT 975A, 54A) for continuity from bulkhead connector to connector at fire extinguisher relay.**

WARNING

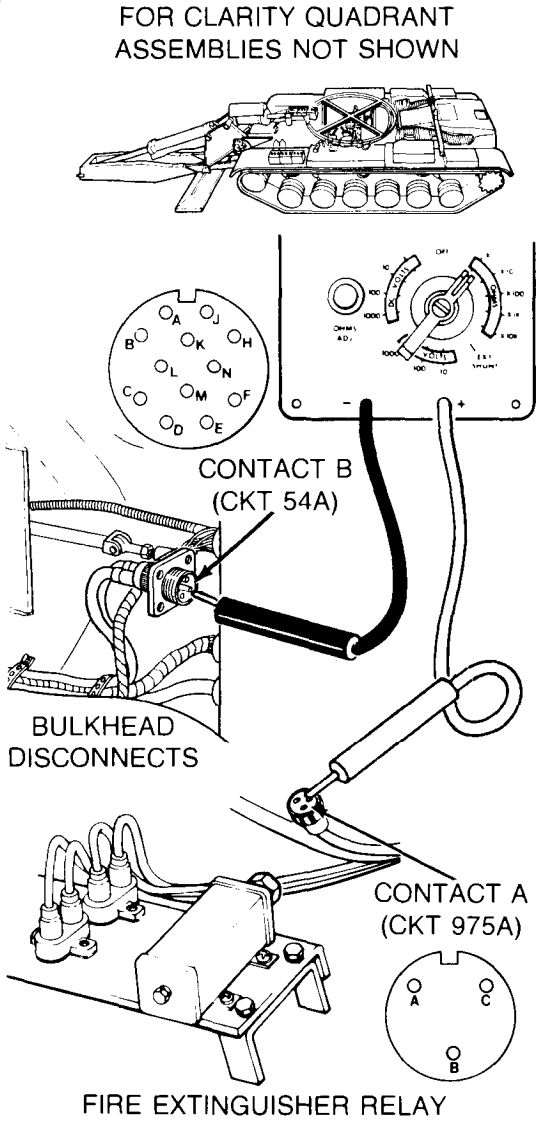
When disconnected, do not allow battery ground straps to come into contact with any metal surface.

Second Technician (Front of Crew Compartment)

- Disconnect three battery ground straps (page 10-268).

First Technician (Commander's Station)

- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Displace front accessory harness connector (CKT 54A) from bulkhead disconnect (page 10-269).
- Disconnect front accessory harness connector from fire extinguisher relay.
- Connect black probe of meter to contact B (CKT 54A) of front accessory harness connector at bulkhead disconnect.



TA250463

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER
(Continued)

Symptom-54

STEP (10) CONTINUED

- Connect red probe of meter to contact A (CKT 975A) at front accessory harness connector to fire extinguisher relay.
- Check if meter indicates continuity.

Does meter indicate continuity?

NO

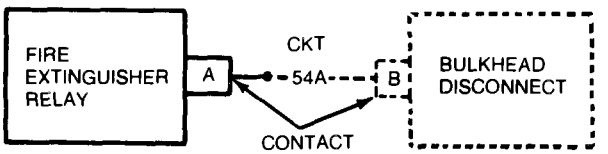
(11)

- **Inspect front accessory harness for bent or broken connector contacts or loose CKT 975A/54A wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of bad front accessory harness.**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**
- **Connect front accessory harness connector at fire extinguisher relay.**
- **Connect three battery ground straps (page 10-268).**

YES

(12)

- **Replace fire extinguisher relay (page 10-158).**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**
- **Connect three battery ground straps (page 10-268).**



TA250464

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER
(Continued)

Symptom-54
FROM STEP (4)

13 **Check fire extinguisher relay circuit breaker for continuity.**

Second Technician (Front of Crew Compartment)

WARNING

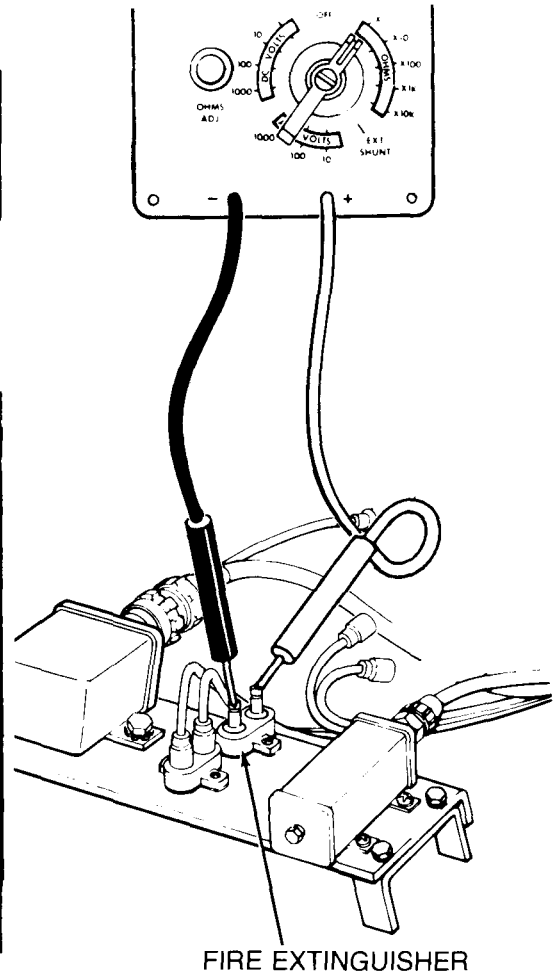
When disconnected, do not allow battery ground straps to come into contact with any metal surface.

- Disconnect three battery ground straps (page 10-268).

First Technician (Commander's Station)

- Set meter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Disconnect two harness connectors (CKT 975) from fire extinguisher relay circuit breaker.
- Connect red probe of meter to one contact and black probe to other contact of fire extinguisher relay circuit breaker.
- Check if meter indicates continuity.

Does meter indicate continuity?



FIRE EXTINGUISHER
RELAY CIRCUIT BREAKER

YES

NO

14 **Replace fire extinguisher relay circuit breaker (page 10-165).**

TA250465

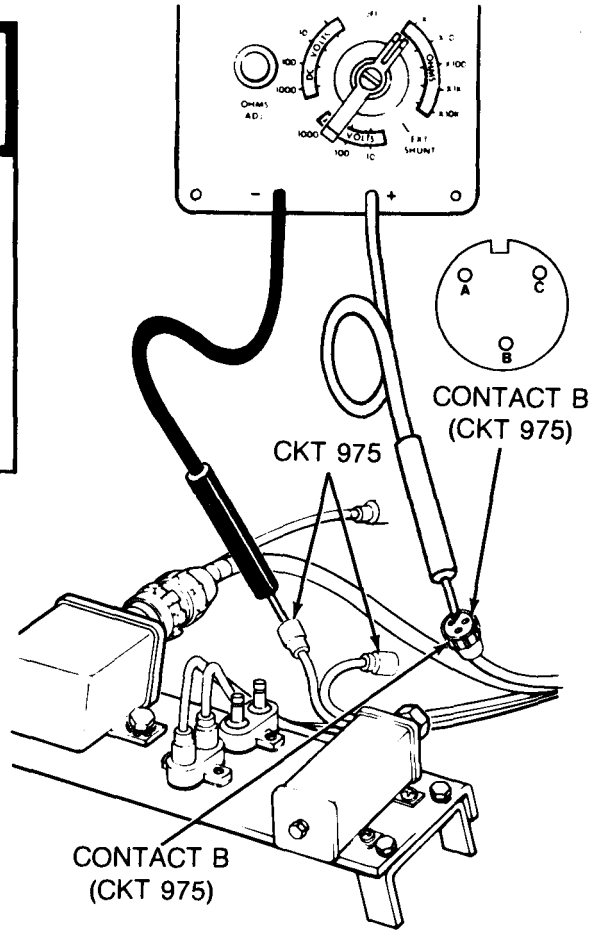
Symptom-54

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER
(Continued)

15 **Check front accessory harness from contact B (CKT 975) of connector at fire extinguisher relay to connector at fire extinguisher relay circuit breaker.**

First Technician (Commander's Station)

- Connect red probe of meter to contact B (CKT 975) of front accessory harness connector at fire extinguisher relay.
- Connect black probe of meter to one connector (CKT 975) at fire extinguisher relay circuit breaker.
- Check if meter indicates continuity.



TA250466

Symptom-54

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - FIRE EXTINGUISHER
(Continued)

STEP (15) CONTINUED

- Repeat above check from other harness connector (CKT 975) at fire extinguisher relay circuit breaker to contact B (CKT 975) of connector at fire extinguisher relay.
- Check if meter indicates continuity.

Does meter indicate continuity at one of the two connectors (CKT 975) to the fire extinguisher relay circuit breaker?

YES

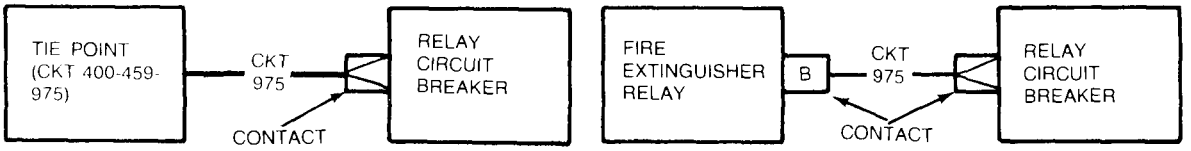
16

- **Inspect hull power harness for bent or broken connector contacts or loose CKT 975 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of bad hull power harness.**
- **Connect front accessory harness connector to fire extinguisher relay.**
- **Connect two harness connectors to fire extinguisher relay circuit breaker.**
- **Connect three battery ground straps (page 10-268).**

NO

17

- **Inspect front accessory harness for bent or broken connector contacts or loose CKT 975 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of bad front accessory wiring harness.**
- **Connect front accessory harness connector to fire extinguisher relay.**
- **Connect two harness connectors to fire extinguisher relay circuit breaker.**
- **Connect three battery ground straps (page 10-268).**



TA250467

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - GAS PARTICULATE

Symptom-55

GAS PARTICULATE HOSE WILL NOT DELIVER SUFFICIENT AIRFLOW.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check if gas particulate blower motor works.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set GAS PARTICULATE switch ON.

First Technician (Commander's Station)

- Listen for sound of blower motor running.

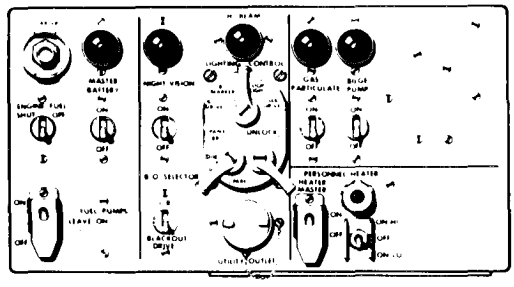
Does blower motor work?

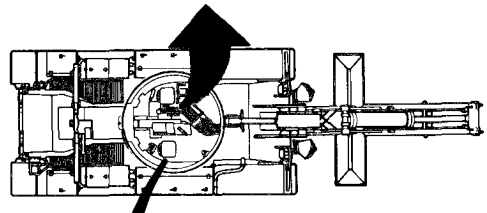
2 See Symptom 56: GAS PARTICULATE BLOWER MOTOR WILL NOT RUN.

NO

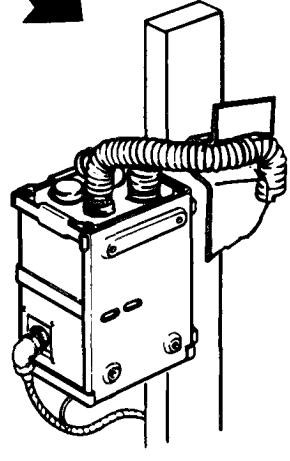
YES

MASTER CONTROL PANEL





FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



PRECLEANER AND PARTICULATE FILTER UNIT

TA250468

Symptom-55

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - GAS PARTICULATE
(Continued)

WARNING

Unit commander or senior officer in charge of maintenance personnel assigned to remove and dispose of contaminated gas filters must prescribe necessary clothing (TM10-277) to be worn during this operation. He must also prescribe necessary safety measures that must be followed including decontamination operation that must be performed before new gas filters are installed (TM3-220).

3 **Check for restricted airflow at gas particulate filter air outlet.**

Second Technician (Operator's Station)

- Set GAS PARTICULATE switch OFF.

First Technician (Commander's Station)

- Disconnect faulty air hose from gas particulate precleaner.

Second Technician (Operator's Station)

- Set GAS PARTICULATE switch ON.

First Technician (Commander's Station)

- Hold hand over filter unit outlet to air hose and check for free airflow.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set GAS PARTICULATE switch OFF.

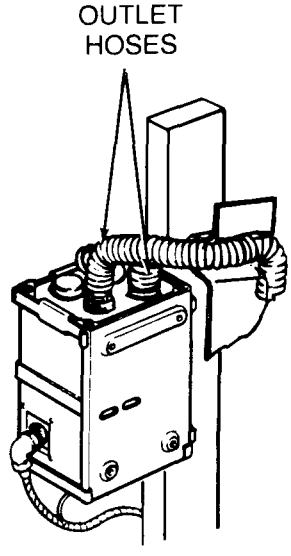
Is there free airflow from filter unit?

4 **Service gas particulate filter unit.**

NO

5

- **Remove blockage from faulty air hose.**
- **If blockage cannot be removed replace faulty air hose.**



PRECLEANER AND PARTICULATE FILTER UNIT

TA250469

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - GAS PARTICULATE

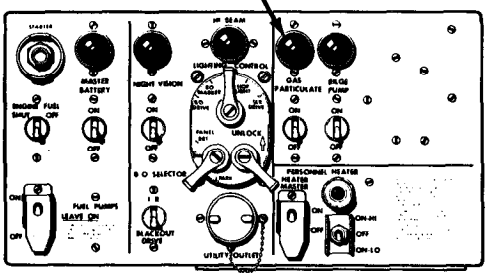
Symptom-56

GAS PARTICULATE BLOWER MOTOR WILL NOT RUN

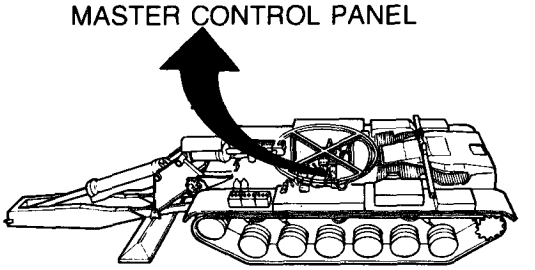
NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

GAS PARTICULATE INDICATOR



MASTER CONTROL PANEL



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

1 **Check if GAS PARTICULATE indicator lamp will light.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set GAS PARTICULATE switch ON.
- Visually check if GAS PARTICULATE indicator lamp is LIT.

Is GAS PARTICULATE indicator lamp lit?

YES

NO

2

- **Check master control panel harness connector (CKT 920) at input to gas particulate circuit breaker for electrical power.**
- **See Step (11) .**

TA250470

Symptom-56

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - GAS PARTICULATE
(Continued)

3 **Check basket-control panel accessories harness (CKT 415D) for electrical power to precleaner and gas particulate filter.**

Second Technician (Operator's Station)

- Set GAS PARTICULATE switch OFF.
- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Disconnect basket-control panel accessories harness connector (CKT 415D) from precleaner and gas particulate filter assembly.
- Set multimeter to measure 18 to 30 volts dc. or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact of basket-control panel accessories harness connector (CKT 415D) and black probe to ground.

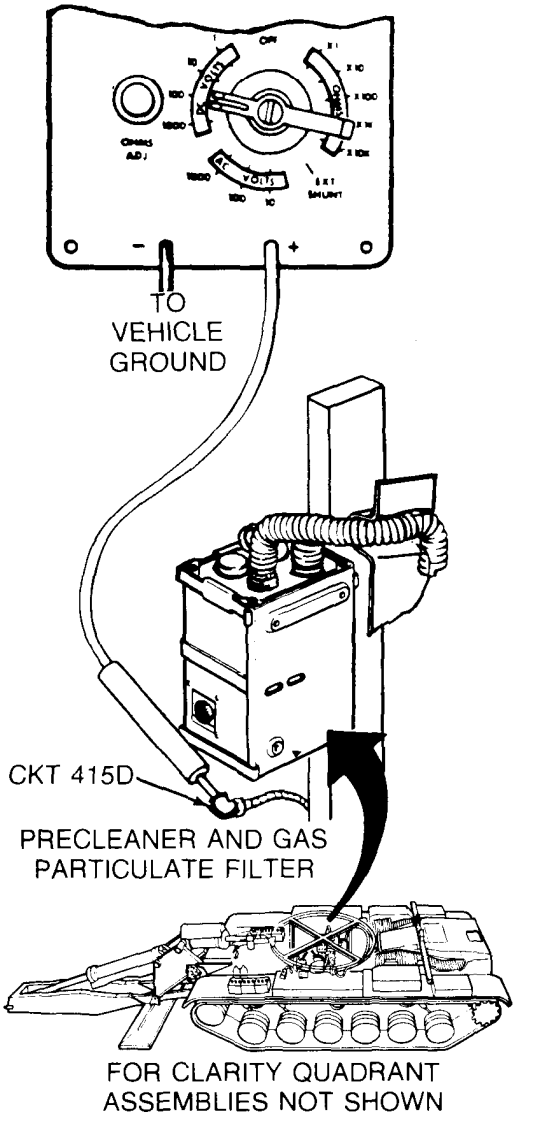
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set GAS PARTICULATE switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



YES

NO

4

- **Check master control panel accessories harness (CKT 415D) at panel connector for electrical power.**

- **See Step (8).**

TA250471

Symptom-56

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - GAS PARTICULATE
(Continued)

5 **Check continuity of ground strap at precleaner and gas particulate filter.**

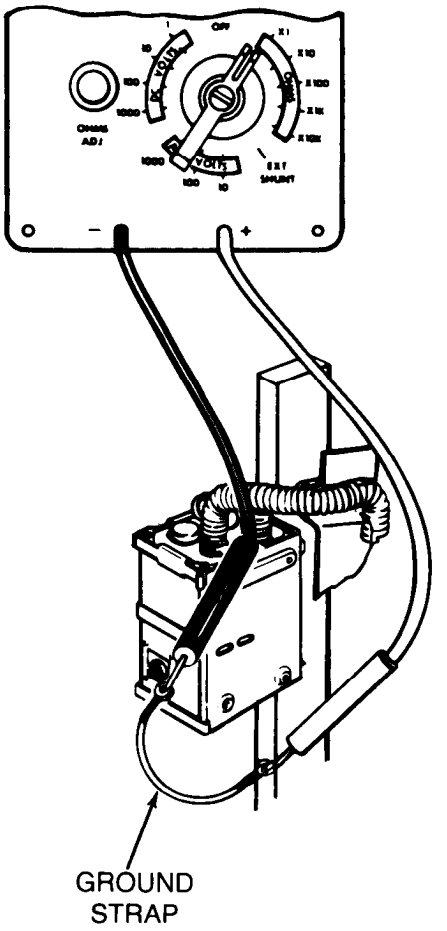
Second Technician (Operator's Station)

- Set GAS PARTICULATE switch OFF.
- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Connect front accessory harness connector (CKT 415D) to precleaner and gas particulate filter.
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE Test No. 91 (page 4-81).
- Connect one meter probe to each end of ground strap.
- Check if meter indicates continuity.

Does meter indicate continuity.



NO

6
- **Clean and tighten loose ground strap connections.**
- **If connections are not loose, replace damaged ground strap.**

YES

7 **Replace precleaner and gas particulate filter assembly.**

TA250472

Symptom-56 **DETAILED TROUBLESHOOTING PROCEDURE**
SUPPORT SYSTEM - GAS PARTICULATE
(Continued)

FROM STEP 4

8 **Check master control panel accessories harness (CKT 415D) at panel connector for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set GAS PARTICULATE switch OFF.

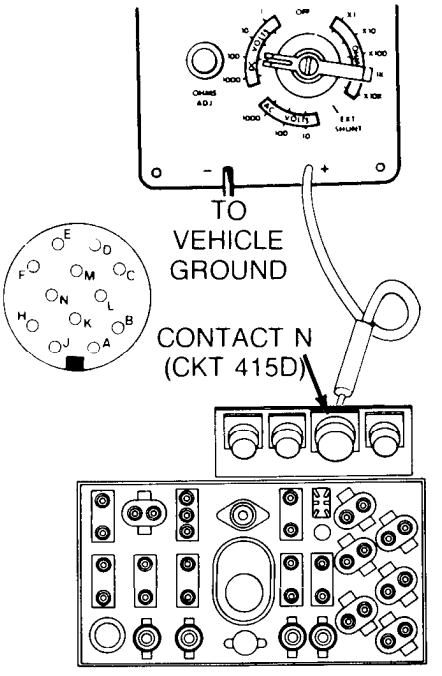
First Technician (Commander's Station)

- Connect basket-control panel accessories harness connector (CKT 415D) to precleaner and gas particulate filter.

Second Technician (Operator's Station)

- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness connector from master control panel.
- Connect red probe of meter to contact N (CKT 415D) of master control panel accessories harness connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Set GAS PARTICULATE switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



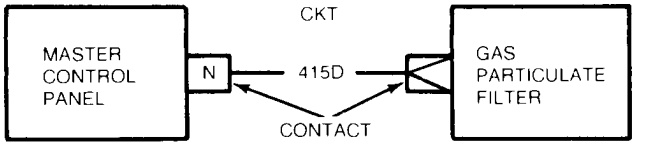
MASTER CONTROL PANEL (REAR VIEW)

9 **Replace master control panel accessories harness (page 10-91).**

NO

YES

10
- **Inspect basket-control panel accessories harness for bent/ broken connector contacts or loose CKT 415D at rear of connectors.**
- **Repair connector if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-control panel accessories harness.**
- **Connect basket-control panel accessories harness connector to master control panel.**
- **Install master control panel (page 10-33).**



TA250473

Symptom-56

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - GAS PARTICULATE
(Continued)

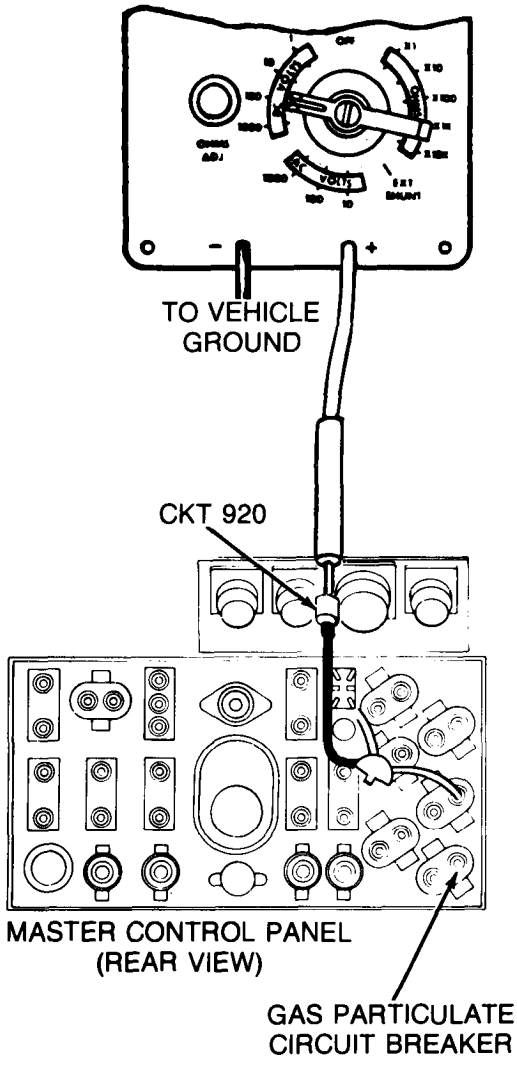
FROM STEP (2)

(11) Check master control panel harness connector (CKT 920) at input to gas particulate circuit breaker for electrical power.

Second Technician (Operator's Station)

- Set GAS PARTICULATE switch OFF.
- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect master control panel harness connector (CKT 920) from gas particulate circuit breaker.
- Set multimeter to measure 18 to 30 volts dc. or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to master control panel harness connector (CKT 920) at gas particulate circuit breaker and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



YES

NO

(12) Replace master control panel power harness (page 10-91).

TA250474

Symptom-56

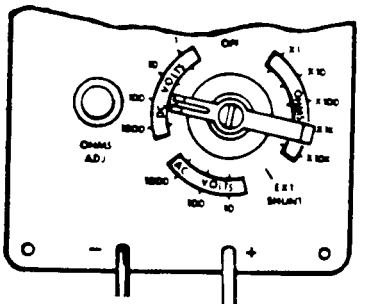
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - GAS PARTICULATE
(Continued)

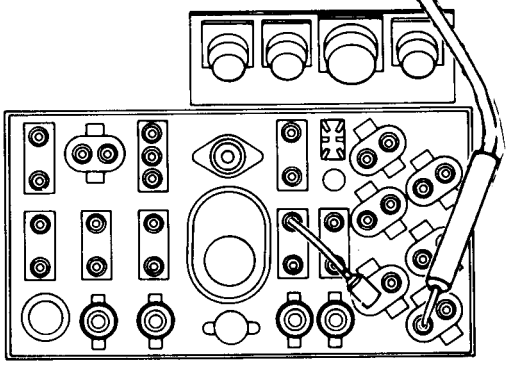
13 **Check output side of gas particulate circuit breaker for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF
- Connect master control panel harness connector to gas particulate circuit breaker.
- Disconnect gas particulate switch cable from gas particulate circuit breaker.
- Connect red probe of meter to outlet side of gas particulate circuit breaker and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?





GAS PARTICULATE SWITCH CABLE

YES

NO

14 **Replace gas particulate circuit breaker (page 10-70).**

TA250475

Symptom-56

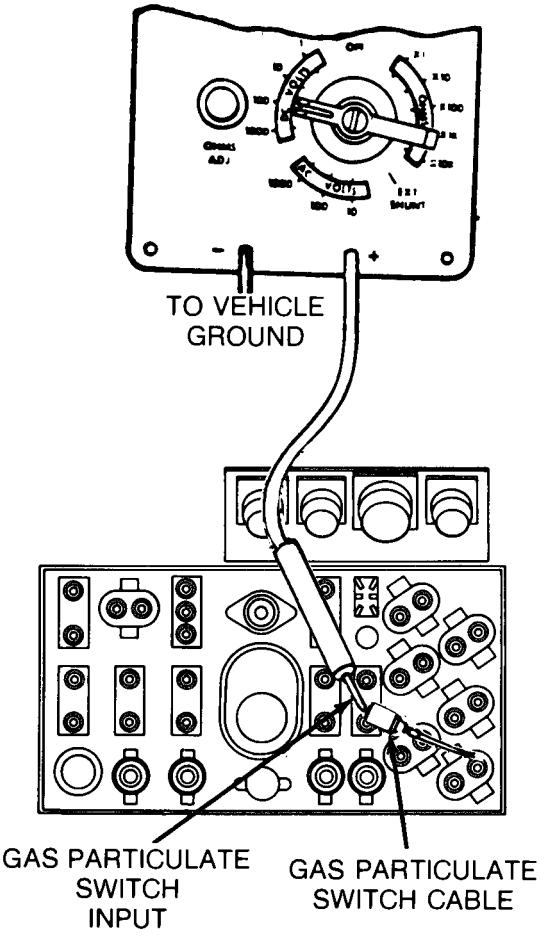
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - GAS PARTICULATE
(Continued)

15 **Check gas particulate switch cable at connector to gas particulate switch for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Connect gas particulate switch cable to gas particulate circuit breaker.
- Disconnect gas particulate switch cable from gas particulate switch.
- Connect red probe of meter to disconnected end of gas particulate switch cable and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 dc.

Does meter indicate 18 to 30 dc?



YES

NO

16 **Replace gas particulate switch cable (page 10-108).**

TA250476

Symptom-56

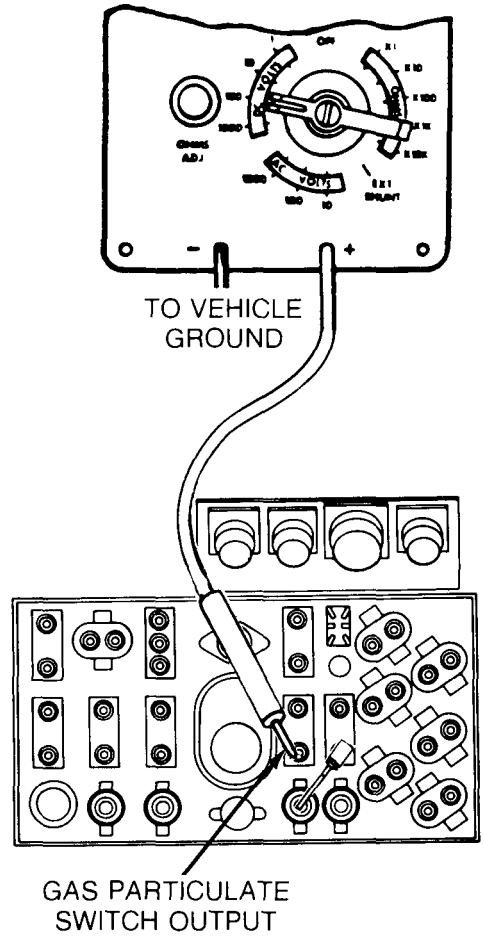
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - GAS PARTICULATE
(Continued)

17 **Check output side of gas particulate switch for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Connect gas particulate switch cable to GAS PARTICULATE switch.
- Disconnect master control panel accessories harness connector (CKT 415) from GAS PARTICULATE switch.
- Connect red probe of meter to output side of GAS PARTICULATE switch (CKT 415) and black probe to ground.
- Set MASTER BATTERY switch ON.
- Set GAS PARTICULATE switch ON.
- Check if meter indicates 18 to 30 volts.

Does meter indicate 18 to 30 volts?



NO → **18** **Replace gas particulate switch (page 10-62).**

YES → **19** **Replace master control panel accessories harness (page 10-91).**

TA250477

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING

Symptom-57

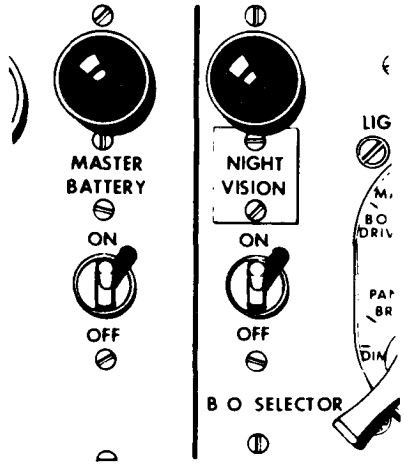
OPERATOR'S DOMELIGHT WILL NOT LIGHT.

1 Check if NIGHT VISION indicator lamp will light.

Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set NIGHT VISION switch ON.
- Check if NIGHT VISION indicator lamp lights.

Does NIGHT VISION indicator lamp light?



(MASTER CONTROL PANEL)

YES

NO

2 See Symptom 70: IR PERISCOPES WILL NOT WORK (NIGHT VISION INDICATOR LAMP WILL NOT LIGHT).

TA250478

Symptom-57

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

3 **Check lead from variable resistor at domelight connector for electrical power.**

Technician (Operator's Station)

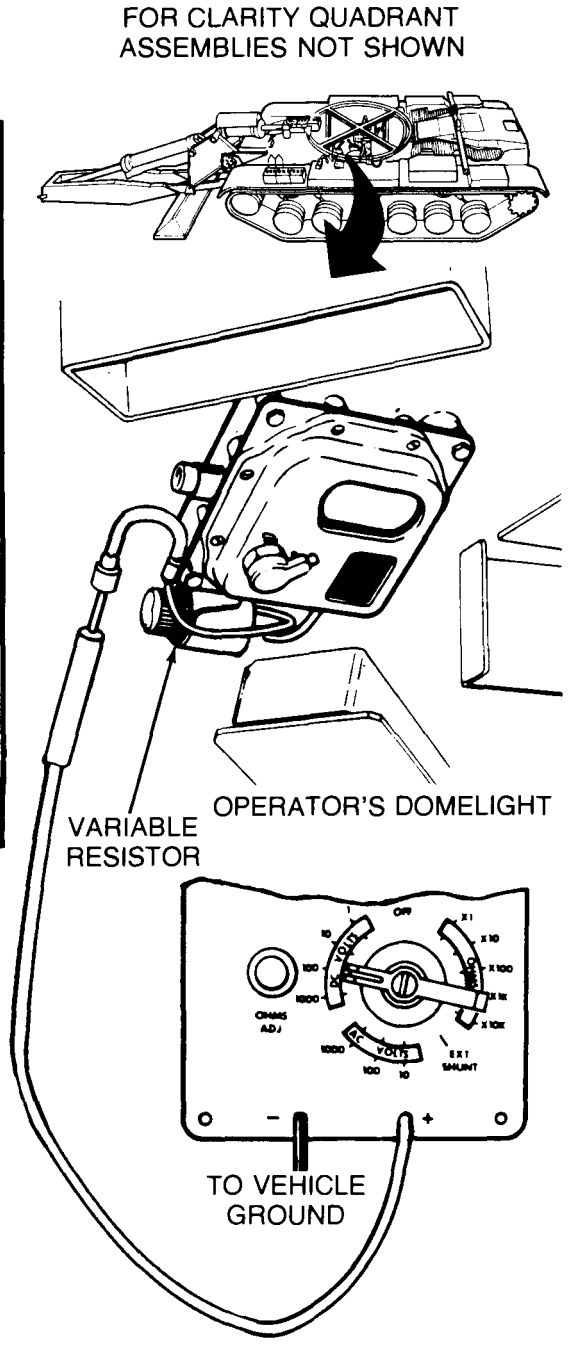
- Set MASTER BATTERY switch OFF.
- Set NIGHT VISION switch OFF.
- Disconnect variable resistor lead connector from domelight connector.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to center contact of variable resistor lead connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

YES

4 **Replace operator's domelight (page 10-191).**

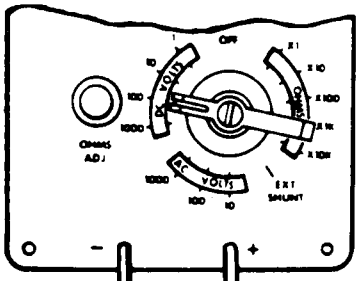
NO



TA250479

Symptom-57

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

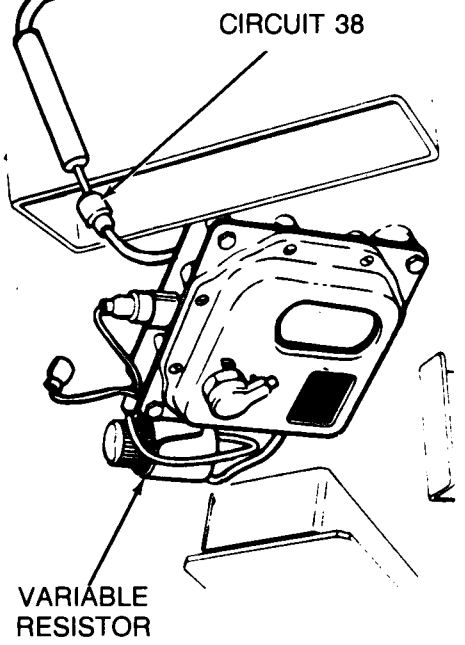


5 **Check basket-control panel accessories harness (CKT 38) at variable resistor lead for electrical power.**

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Reconnect variable resistor lead connector to domelight connector.
- Disconnect basket-control panel accessories harness connector (CKT 38) from variable resistor lead connector.
- Connect red probe of meter to basket-control panel accessories harness connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



NO

YES

6 **Replace variable resistor assembly (page 10-201).**

TA250480

Symptom-57

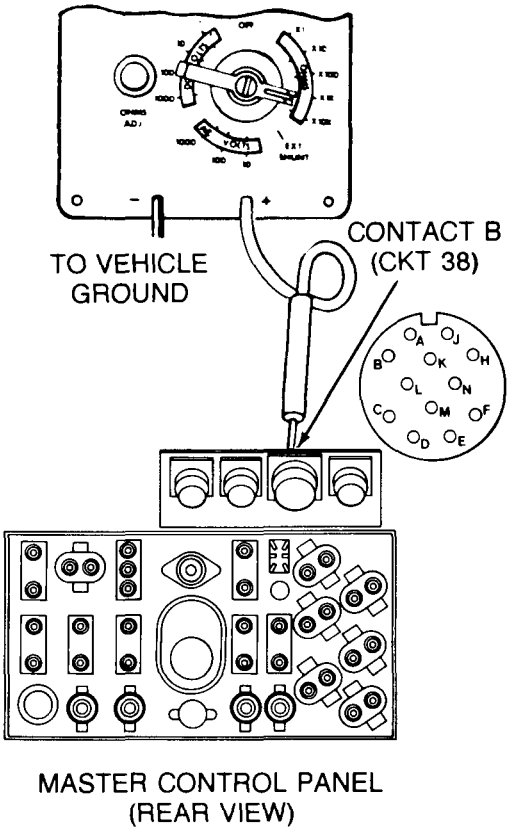
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

7 **Check for electrical power at master control panel accessories harness (CKT 38) panel connector.**

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Reconnect basket-control panel accessories harness connector (CKT 38) to variable resistor lead connector.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness connector from master control panel.
- Connect red probe of meter to contact B (CKT 38) of master control panel accessories harness panel connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

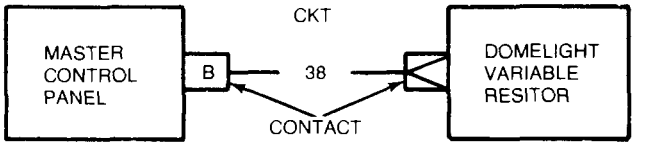


YES

9
- **Inspect basket-control panel accessories harness for bent/broken connector contacts or loose CKT 38 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-control panel accessories harness.**
- **Install basket-control panel accessories harness to master control panel.**
- **Install master control panel (page 10-33).**

NO

8 **Replace master control panel accessories harness (page 10-91).**



TA250481

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING

Symptom-58

GAGE INSTRUMENT PANEL LAMPS WILL NOT LIGHT (PANEL LIGHT SWITCH AT BRIGHT).

NOTE

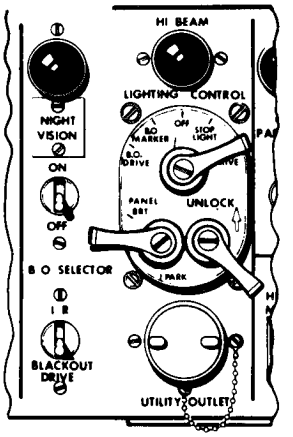
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check if gage instrument panel lamps will light with PANEL LIGHT switch at DIM.

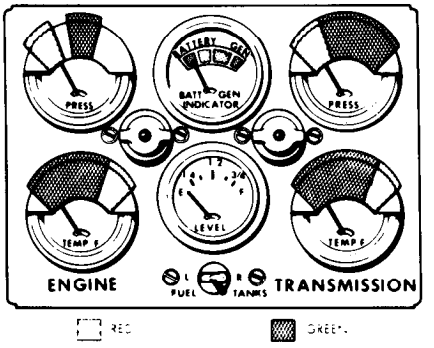
First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- On LIGHTING CONTROL switch, turn ON-OFF lever to SER DRIVE and turn PANEL lever to DIM.
- Visually check if gage instrument panel lamps are lit.

Are gage instrument panel lamps lit?



MASTER CONTROL PANEL



GAGE INSTRUMENT PANEL

NO

YES

2 Replace LIGHTING CONTROL switch (page 10-54).

TA250482

Symptom-58

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

3 **Check if service stoplight will light.**

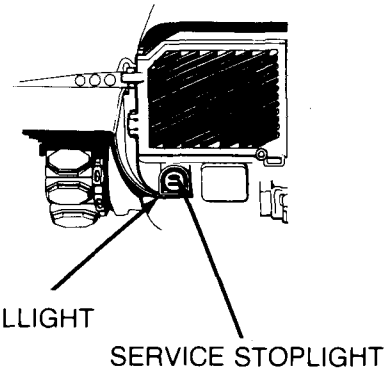
First Technician (Operator's Station)

- On LIGHTING CONTROL switch, turn ON-OFF lever to STOPLIGHT and turn PANEL lever to BRT.
- Step on brake pedal and keep it pressed.

Second Technician (Rear Grille Doors)

- Visually check if service stoplight is working.

Does service stoplight light?



YES

NO

4 **Replace LIGHTING CONTROL switch (page 10-54).**

TA250483

Symptom-58

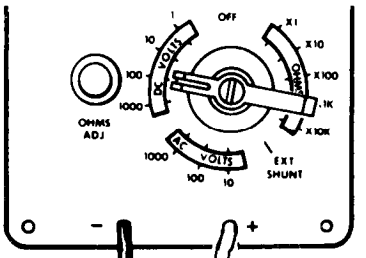
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

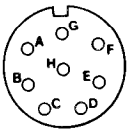
5 **Check basket indicator panel harness (CKT 40) at gage instrument panel for electrical power.**

First Technician (Operator's Station)

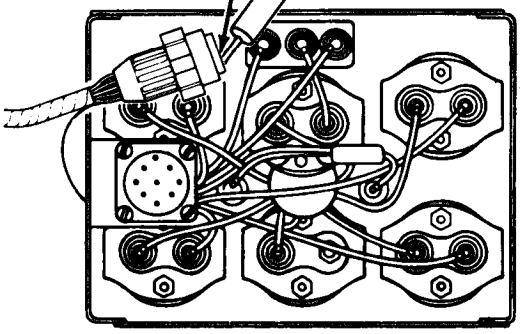
- Set MASTER BATTERY switch OFF.
- Displace gage instrument panel (page 10-111).
- Disconnect basket-indicator panel harness connector from gage instrument panel.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact B (CKT 40) of basket-indicator panel harness connector at gage instrument panel and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts.

Does meter indicate 18 to 30 volts?





CONTACT B (CKT 40)

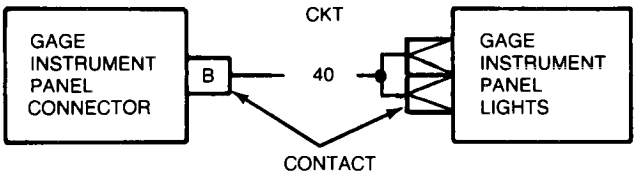


GAGE INSTRUMENT PANEL (REAR VIEW)

NO

YES

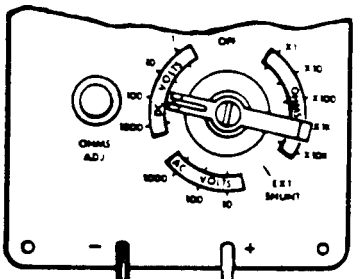
6 **Repair gage instrument panel harness (CKT 40) (page 10-298).**

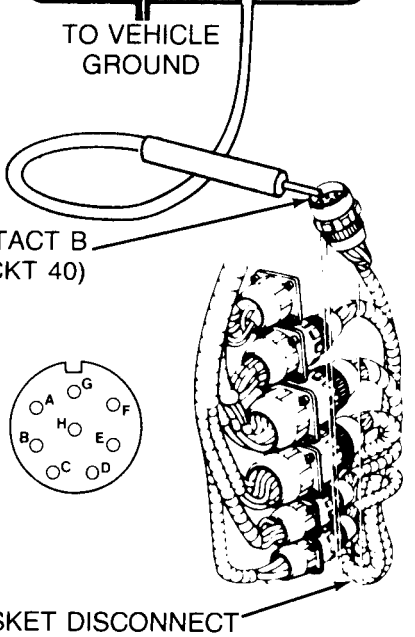


TA250484

Symptom-58

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)





7 **Check front accessories harness (CKT 40) at basket disconnect for electrical power.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

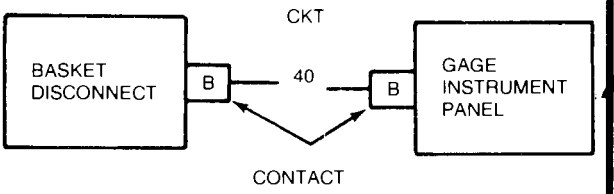
Second Technician (Commander's Station)

- Disconnect front accessory harness connector (CKT 40) from basket-indicator panel harness connector at basket disconnect.
- Connect red probe of meter to contact B (CKT 40) of front accessory harness connector and black probe to ground.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



NO

YES

8

- **Inspect basket-indicator panel harness for bent/ broken connector contacts or loose CKT 40 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-indicator panel harness.**
- **Install gage instrument panel (page 10-112).**

TA250485

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

Symptom-58

9 **Check basket-light switch harness (CKT 40) for power at basket disconnect.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Install gage instrument panel (page 10-112).

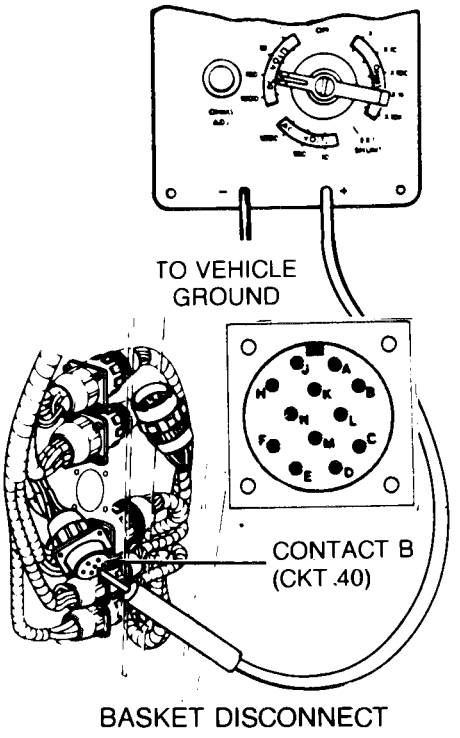
Second Technician (Commander's Station)

- Connect front accessory harness connector to basket disconnect.
- Displace basket-light switch harness connector at basket disconnect.
- Connect red probe of meter to contact B (CKT 40) of basket-light switch harness connector at basket disconnect, and the black probe to ground.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

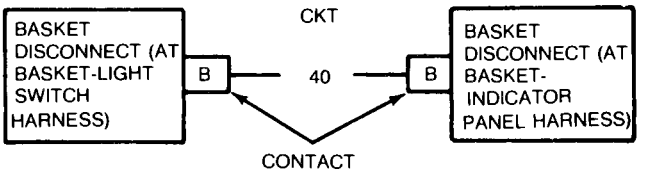


NO

YES

10

- **Inspect front accessories harness for bent/broken connector contacts or loose CKT 40 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessories harness.**
- **Install basket-light switch harness connector at basket disconnect.**



TA250486

Symptom-58

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

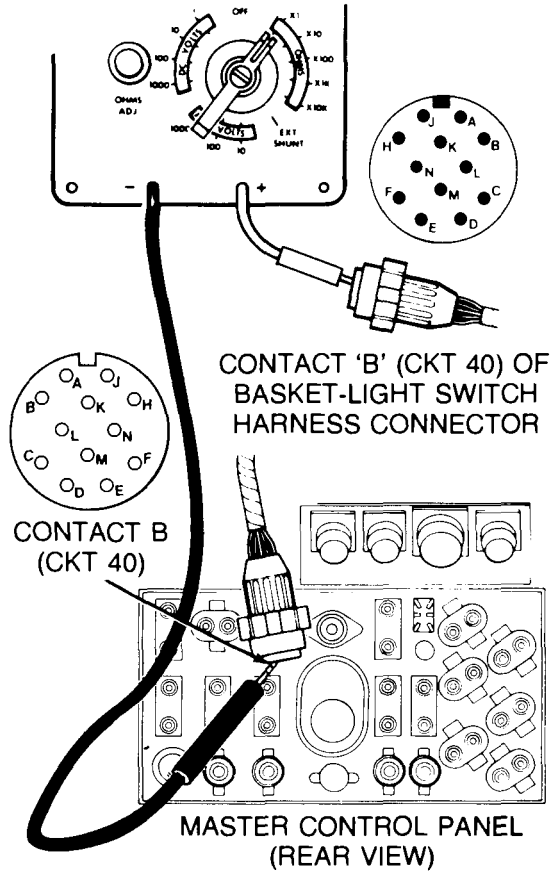
11 **Check basket-light switch harness (CKT 40) for continuity from connector at LIGHTING CONTROL switch to basket disconnect.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-light switch harness connector from LIGHTING CONTROL switch.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect black probe of meter to contact B (CKT 40) of basket-light switch harness connector at LIGHTING CONTROL switch.

Second Technician (Commander's Station)

- Connect red probe of meter to contact B (CKT 40) of basket-light switch harness connector at basket-disconnect.
- Check if meter indicates continuity.



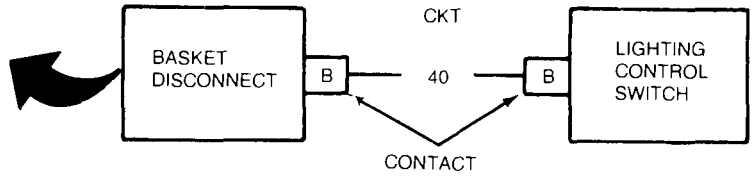
Does meter indicate continuity?

NO

12
- **Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 40 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-light switch harness.**
- **Install master control panel (page 10-33).**
- **Install basket-light switch harness connector at basket disconnect.**

YES

13
- **Replace LIGHTING CONTROL switch (page 10-54).**
- **Install basket-light switch harness connector at basket disconnect.**



TA250487

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING

Symptom-59

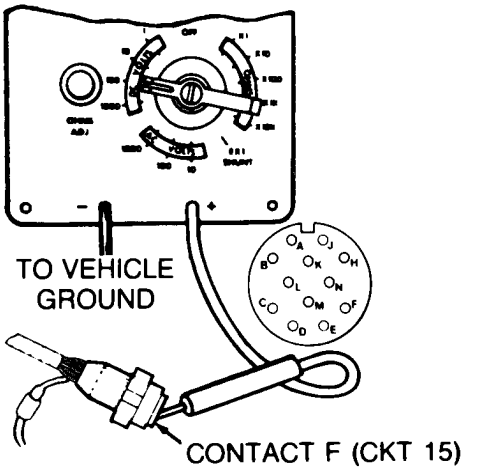
LIGHTS CONTROLLED BY LIGHTING CONTROL SWITCH WILL NOT LIGHT (PANEL SWITCH AT OFF, BRIGHT, OR DIM).

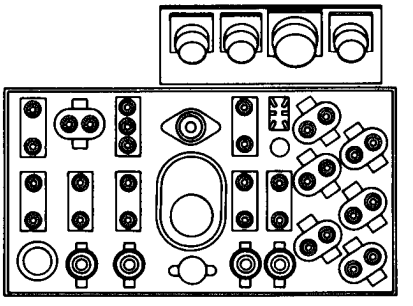
1 Check basket-light switch harness (CKT 15) at LIGHTING CONTROL switch for electrical power.

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-light switch harness connector from LIGHTING CONTROL switch connector.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact F (CKT 15) of harness connector. Connect black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?





MASTER CONTROL PANEL (REAR VIEW)

YES

NO

2

- **Check basket-light switch harness (CKT 15) for continuity from intermediate connector to connector at LIGHTING CONTROL switch.**

- **See Step (6).**

TA250488

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

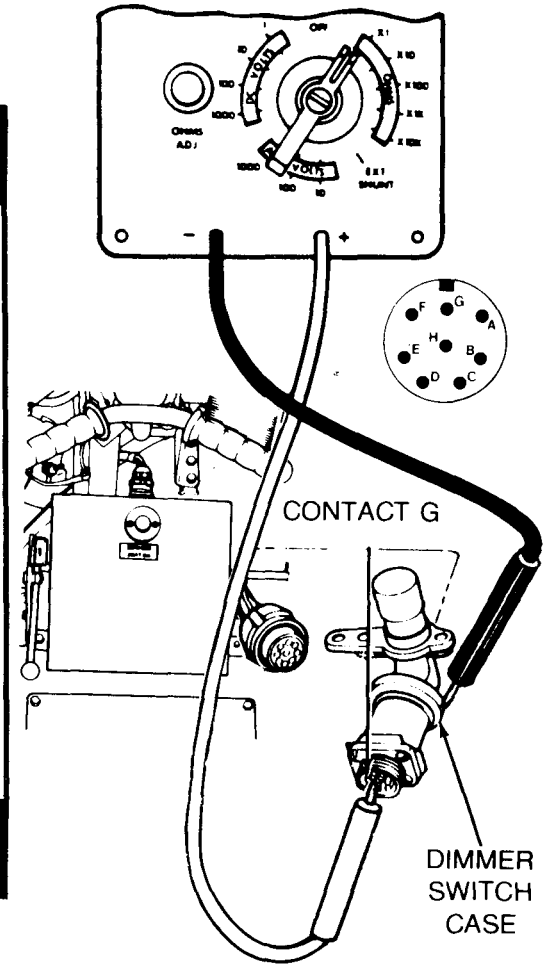
Symptom-59

3 **Check foot DIMMER SWITCH (CKT 16) for internal short.**

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Remove foot DIMMER SWITCH (page 10-171).
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact G (CKT 16) of foot DIMMER SWITCH connector and black probe to case of foot DIMMER SWITCH.
- Operate foot DIMMER SWITCH in both HIGH and LOW BEAM positions.
- Check if meter indicates less than infinite resistance in either foot DIMMER SWITCH position.

Does meter indicate less than infinite resistance, thereby indicating a short?



DIMMER SWITCH (LOCATED NEAR DRIVER'S LEFT FOOT)

NO → **4** **Replace LIGHTING CONTROL switch (page 10-54).**

YES → **5** **Replace foot DIMMER SWITCH (page 10-171).**

TA250489

Symptom-59
FROM STEP

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

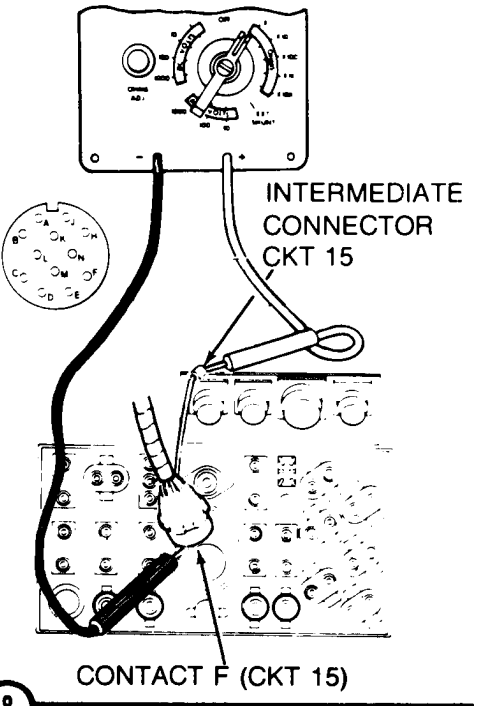
(2)

6 **Check basket-light switch harness (CKT 15) for continuity from intermediate connector to connector at LIGHTING CONTROL switch.**

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect basket-light switch harness intermediate connector (CKT 15) from master control panel power harness connector.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to center contact of basket-light switch harness (CKT 15) intermediate connector at LIGHTING CONTROL switch.
- Connect black probe of meter to contact F (CKT 15) of basket-light switch harness connector at LIGHTING CONTROL switch.
- Check if meter indicates continuity.

Does meter indicate continuity?

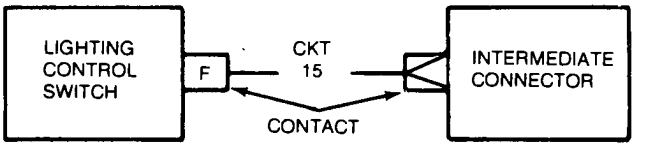


8
- **Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 15 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-light switch harness.**
- **Install master control panel (page 10-33).**

YES

NO

7 **Replace master control panel power harness (page 10-101).**



TA250490

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING

Symptom-60

PANEL AND DRIVE LIGHTS ARE VERY DIM OR WILL NOT LIGHT WITH PANEL LIGHT SWITCH AT BRIGHT, DIM, OR PARK (LIGHTS ARE OK WITH PANEL LIGHT SWITCH AT OFF).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 **Check if vehicle lights work after disconnecting front accessory harness connector (CKT 40) from basket-indicator panel harness connector at basket disconnect.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect front accessory harness connector (CKT 40) from basket-indicator panel harness connector at basket disconnect (top connector).
- Set MASTER BATTERY switch ON.
- On LIGHTING CONTROL switch, turn ON-OFF lever to SER DRIVE and turn PANEL lever to BRT.

Second Technician (Front of Vehicle)

- Visually check if service lights are working properly

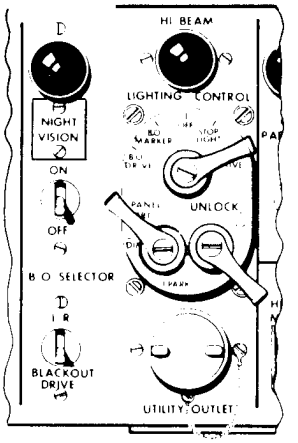
Are vehicle lights working properly?

YES

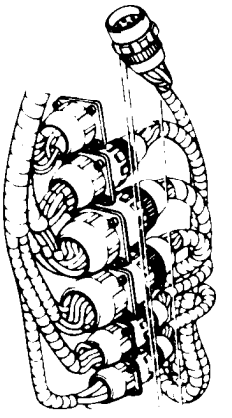
NO

2 **Check front accessory harness (CKT 40) at basket disconnect for short to ground.**

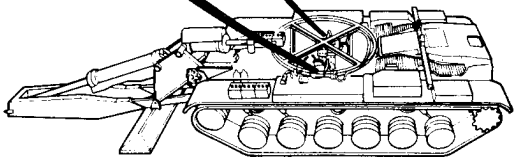
- **See Step (10).**



MASTER CONTROL PANEL



BASKET DISCONNECTS



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

TA250491

Symptom-60

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

3 **Check if vehicle lights work after disconnecting basket-indicator panel harness connector from gage instrument panel.**

First Technician (Operator's Station)

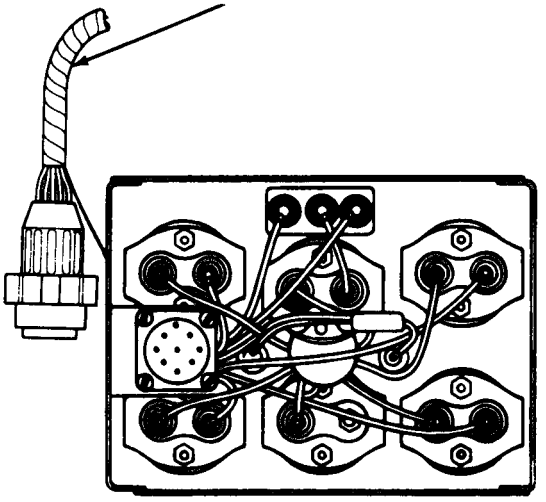
- Set MASTER BATTERY switch OFF.
- Connect front accessory harness connector to basket-indicator panel harness connector at basket disconnect.
- Displace gage instrument panel (page 10-111).
- Disconnect basket-indicator panel harness connector from gage instrument panel.
- Set MASTER BATTERY switch ON.

Second Technician (Front of Vehicle)

- Visually check if service lights are working properly.

Are vehicle lights working properly?

BASKET-INDICATOR PANEL HARNESS



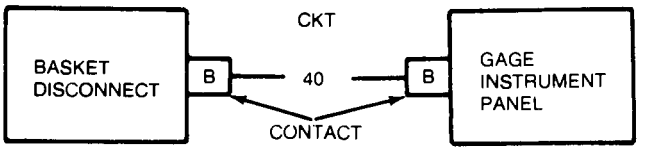
GAGE INSTRUMENT PANEL (REAR VIEW)

4

- **Inspect basket-indicator panel harness for bent/broken connector contacts or loose CKT 40 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-indicator panel harness.**
- **Install gage instrument panel (page 10-112).**

YES

NO



TA250492

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

Symptom-60

5 **Check if vehicle lights work after disconnecting gage instrument panel harness connectors (CKT 40) from both panel lights.**

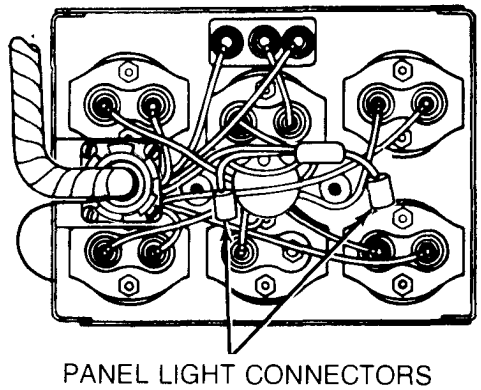
First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Connect basket-indicator panel harness connector to gage instrument panel harness connector.
- Disconnect gage instrument panel harness connectors (CKT 40) from both panel lights.
- Set MASTER BATTERY switch ON.

Second Technician (Front of Vehicle)

- Visually check if service lights are working properly.

Are vehicle lights working properly?



PANEL LIGHT CONNECTORS

YES

NO

6 **Repair gage instrument panel harness (CKT 40) (page 10-298).**

TA250493

Symptom-60

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

7 **Check if vehicle lights work after reconnecting gage instrument panel harness connector (CKT 40) to one of the panel lights.**

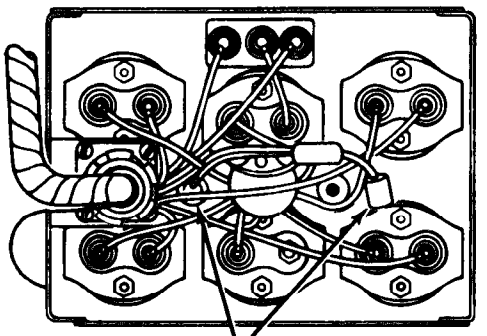
First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Connect gage instrument panel harness connector (CKT 40 to one of the panel lights).
- Set MASTER BATTERY switch ON.

Second Technician (Front of Vehicle)

- Visually check if service lights are working properly.

Are vehicle lights working properly?



PANEL LIGHT CONNECTORS

NO → **8** **Replace connected panel lamp socket (page 10-123).**

YES → **9** **Replace unconnected panel lamp socket (page 10-123).**

TA250494

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

Symptom-60

FROM STEP (2)

10 Check front accessory harness (CKT 40) at basket disconnect for short to ground.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace gage instrument panel (page 10-111).
- Disconnect basket-indicator panel harness connector from gage instrument panel.

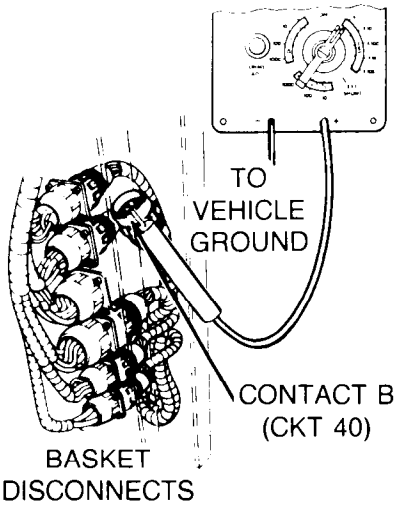
Second Technician (Commander's Station)

- Reconnect front accessory harness connector to basket-indicator panel harness connector at basket disconnect.
- Disconnect front accessory harness connector (CKT 40) from basket-light switch harness connector at basket disconnect (third connector from top).
- Set ohmmeter to OHMS X1 scale and zero meter, or use STE/ICE Test No. 91 (page 4-81).
- Connect red probe of meter to contact B (CKT 40) of front accessory harness connector and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity, thereby indicating a short?

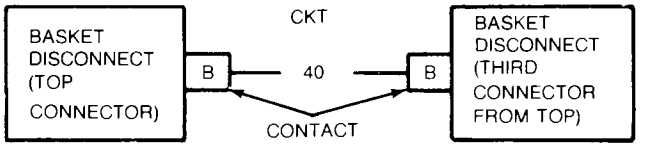
NO

YES



11

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 40 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Connect front accessory harness connector to basket-light switch harness connector at basket disconnect.**
- **Connect basket-indicator panel harness connector to gage instrument panel.**
- **Install gage instrument panel (page 10-112).**



TA250495

Symptom-60

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

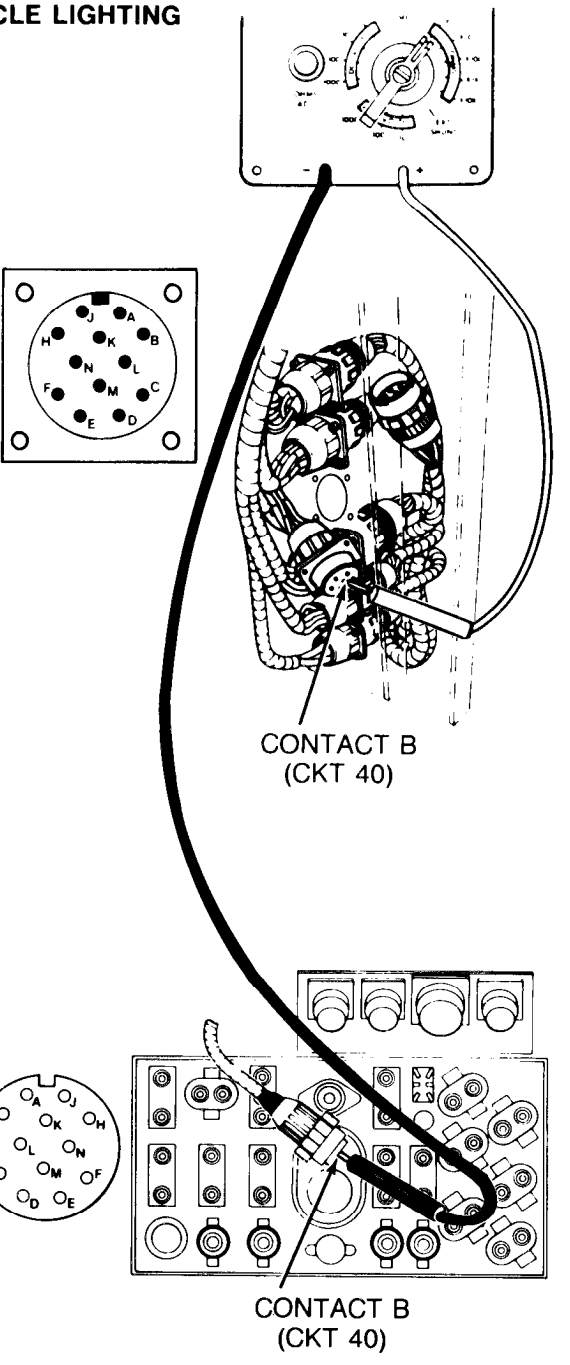
12 **Check basket-light switch harness (CKT 40) from connector at basket disconnect to connector at LIGHTING CONTROL switch for continuity.**

First Technician (Operator's Station)

- Connect basket-indicator panel harness connector to gage instrument panel.
- Install gage instrument panel (page 10-112).
- Displace master control panel (page 10-33).
- Disconnect basket-light switch harness connector from LIGHTING CONTROL switch.
- Connect black probe of meter to contact B (CKT 40) of basket-light switch harness connector at LIGHTING CONTROL switch.

Second Technician (Commander's Station)

- Displace basket-light switch harness connector (CKT 40) at basket disconnect (page 10-269).
- Connect red probe of meter to contact B (CKT 40) of basket-light switch harness connector at basket disconnect.



TA250496

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

Symptom-60

STEP (12) CONTINUED

First Technician (Operator's Station)

- Check if meter indicates continuity.

Does meter indicate continuity?

NO

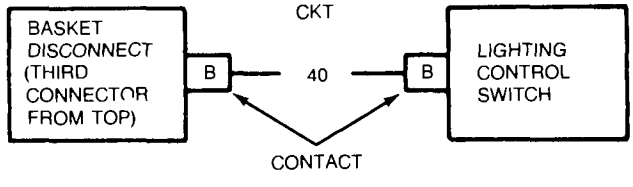
13

- **Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 40 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-light switch harness.**
- **Install basket-light switch harness connector at basket disconnect.**
- **Connect basket-light switch harness connector to LIGHTING CONTROL SWITCH.**
- **Install master control panel (page 10-33).**

YES

14

- **Replace LIGHTING CONTROL switch (page 10-54).**
- **Install basket-light switch harness connector at basket disconnect.**



TA250497

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING

Symptom-61

SERVICE STOPLIGHT WILL NOT LIGHT.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

(1) Check if B.O. stoplight will light.

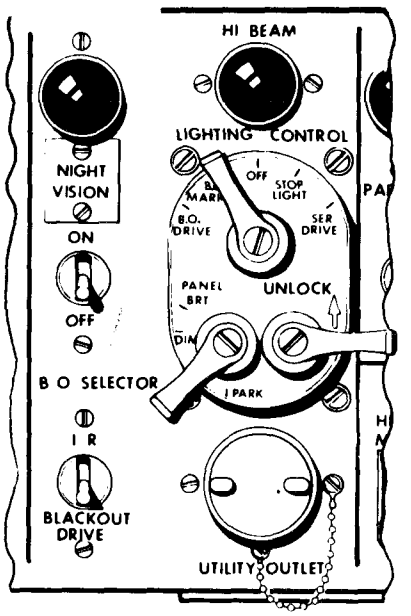
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- On LIGHTING CONTROL switch turn LIGHTING CONTROL lever to B.O. MARKER.
- Press and hold brake pedal.

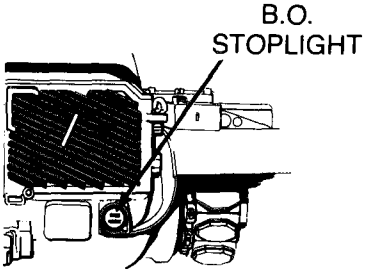
First Technician (Rear Grille Doors)

- Visually check if B.O. stoplight lights when brake pedal is pressed.

Does B.O. stoplight light?



MASTER CONTROL PANEL



RIGHT TAILLIGHT

YES

NO

(2)

- **Check stoplight switch at brake master cylinder for continuity.**
- **See Step (12) .**

TA250498

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

Symptom-61

3 **Check rear accessory harness (CKT 22) at left taillight assembly for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First and Second Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

First Technician (Rear Grille Doors)

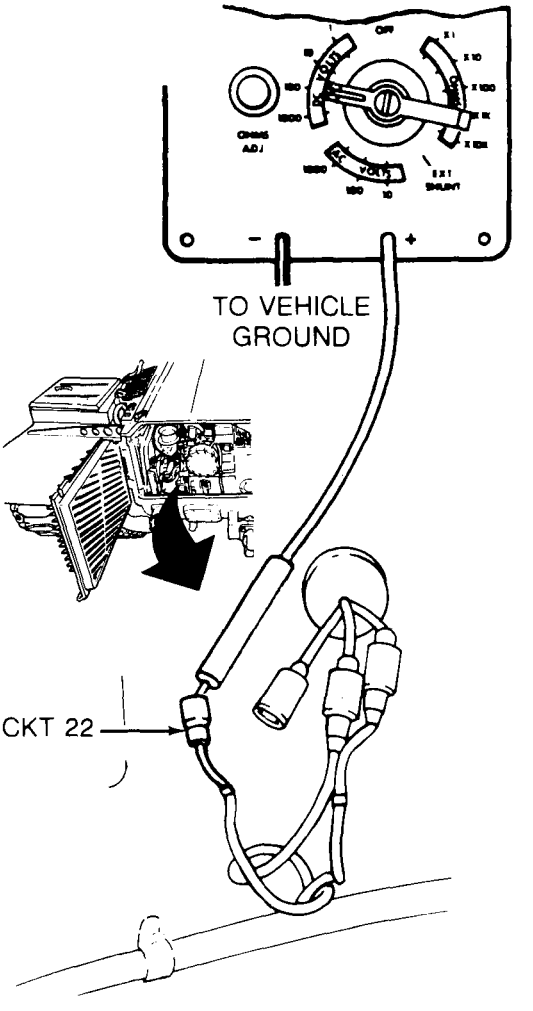
- Disconnect rear accessory harness connector (CKT 22) from left taillight assembly.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to rear accessory harness connector (CKT 22) and black probe to vehicle ground.

Second Technician (Operator's Station)

- On LIGHTING CONTROL switch, turn LIGHTING CONTROL lever to STOPLIGHT.
- Set MASTER BATTERY switch ON.
- Press and hold brake pedal.

First Technician (Rear Grille Doors)

- Check if meter indicates 18 to 30 volts dc while brake pedal is pressed.



LEFT TAILLIGHT CONNECTORS

Does meter indicate 18 to 30 volts dc?

YES

NO

4 **Replace socket and wiring assembly in left taillight (page 10-298).**

TA250499

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

Symptom-61

5 **Check front accessory harness (CKT 22) at bulkhead disconnect for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Rear Grille Doors)

- Reconnect rear accessory harness connector (CKT 22) to left taillight assembly.

First and Second Technicians (Rear Grille Doors)

- Install transmission shroud (page 9-6).

First Technician (Commander's Station)

- Displace front accessory harness connector from bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact B (CKT 22) of front accessory harness connector and black probe to ground.

Second Technician (Operator's Station)

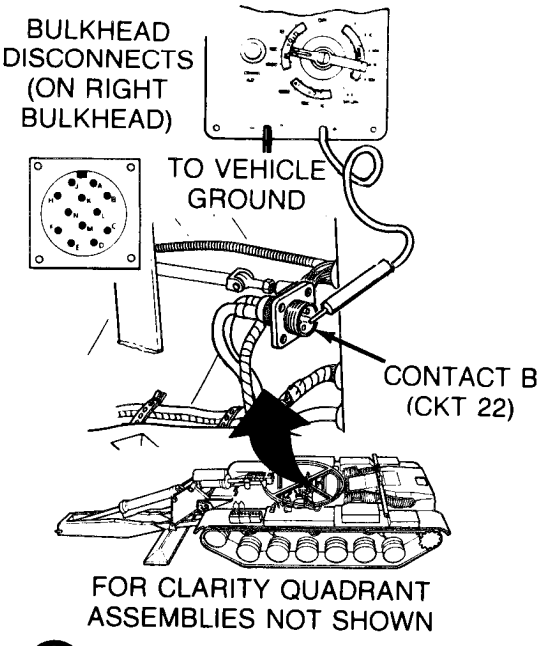
- Set MASTER BATTERY switch ON.
- Press and hold brake pedal.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc while brake pedal is pressed.

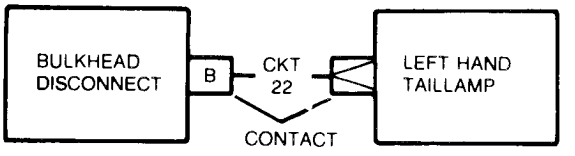
Does meter indicate 18 to 30 volts dc?

NO — YES



6

- **Inspect rear accessory harness for bent/broken connector contacts or loose CKT 22 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective rear accessory harness.**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**



TA250500

Symptom-61

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

7 Check basket-light switch harness (CKT 22) at basket disconnect for electrical power.

Second Technician (Operator's Station)

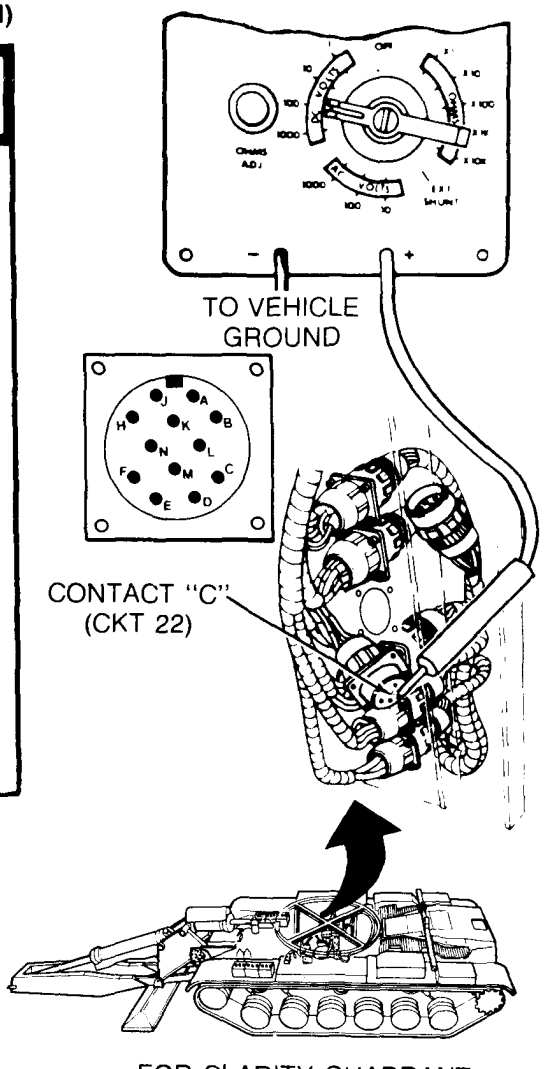
- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).
- Displace basket-light switch harness connector (CKT 22) at basket disconnect.
- Connect red probe of meter to contact "C" (CKT 22) of basket-light switch harness connector and black probe to ground.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and hold brake pedal.



TA250501

Symptom-61

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

STEP (7) CONTINUED

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

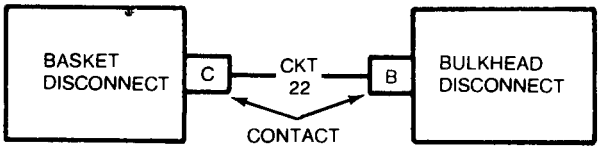
Does meter indicate 18 to 30 volts dc?

YES

(8)

- **Inspect front accessories harness for bent/broken connector contacts or loose CKT 22 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessories harness.**
- **Install basket-light switch harness connector at basket disconnect.**

NO



TA250502

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

Symptom-61

9 **Check basket-light switch harness (CKT 22) for continuity from basket disconnect to connector at LIGHTING CONTROL switch.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-light switch harness connector from LIGHTING CONTROL switch connector on master control panel.

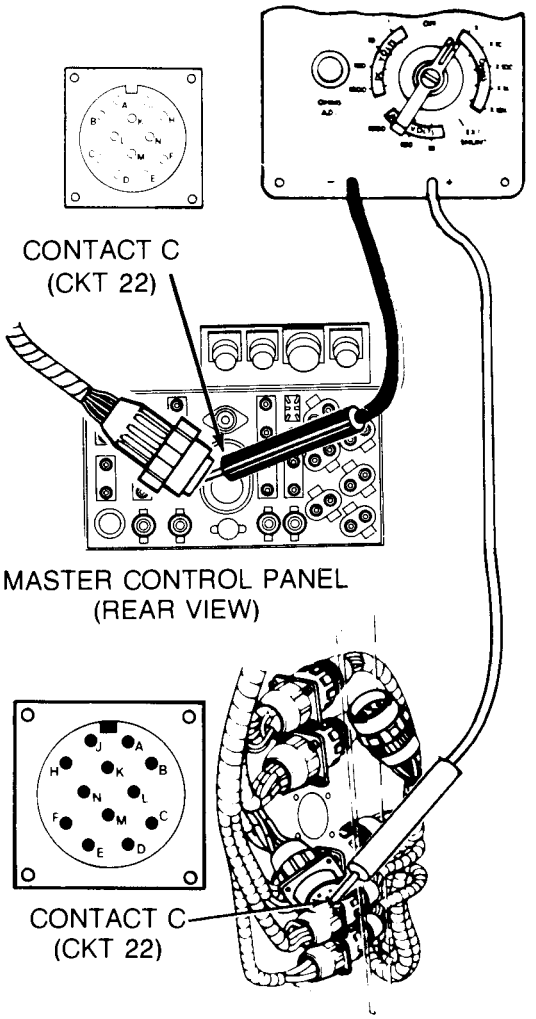
First Technician (Commander's Station)

- Set multimeter to OHMS X1 scale and "zero"meter or use STE/ICE Test No. 91 (page 4-83).

Second Technician (Operator's Station)

- Connect black probe of meter to contact C (CKT 22) of basket-light switch harness connector at LIGHTING CONTROL switch.

First Technician (Commander's Station)



TA250503

Symptom-61

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

STEP (9) CONTINUED

- Connect red probe of meter to contact C (CKT 22) of basket-light switch harness connector at basket disconnect.
- Check if meter indicates continuity.

Does meter indicate continuity?

NO

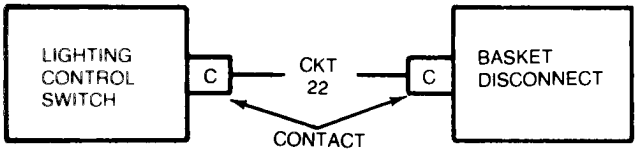
10

- **Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 22 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of defective basket-light switch harness.**
- **Connect basket-light switch harness connector to lighting control switch.**
- **Install basket-light switch harness connector at basket disconnect.**
- **Install master control panel (page 10-33).**

YES

11

- **Replace LIGHTING CONTROL switch (page 10-54).**
- **Install basket-light switch harness connector at basket disconnect.**



TA250504

Symptom-61

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

FROM STEP (2)

12 Check stoplight switch at brake master cylinder for continuity.

Second Technician (Operator's Station)

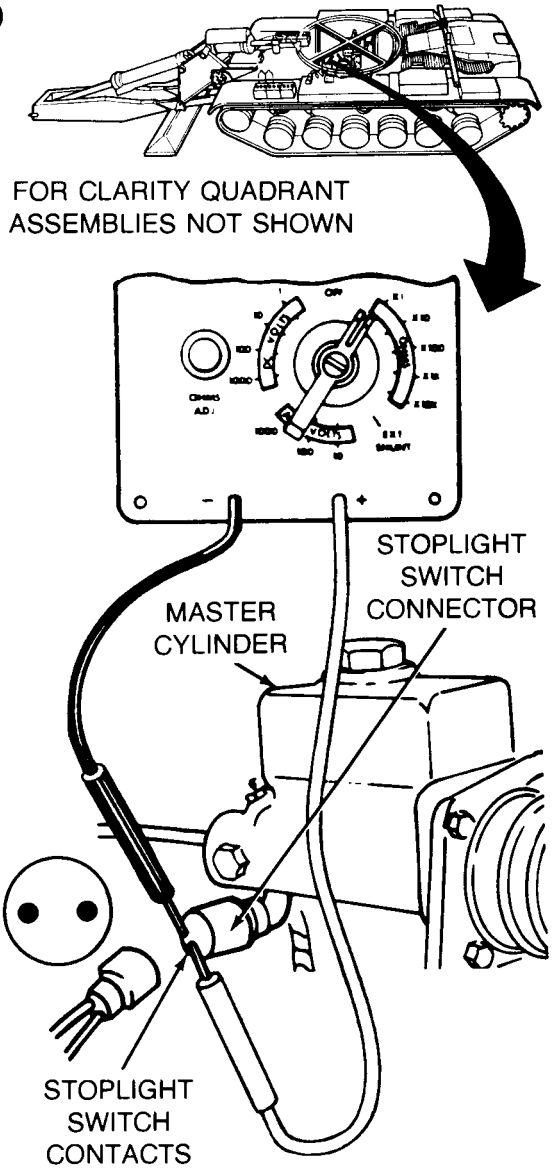
- Set MASTER BATTERY switch OFF.
- Disconnect basket-light switch harness connector (CKT 75) from master cylinder stoplight switch.
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE Test No. 91 (page 10-83).
- Connect two probes of meter to the two contacts of stoplight switch.
- Press and hold brake pedal.
- Check if meter indicates continuity while brake pedal is pressed.

Does meter indicate continuity?

YES

NO

13 Replace stoplight switch (page 13-31).



TA250505

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

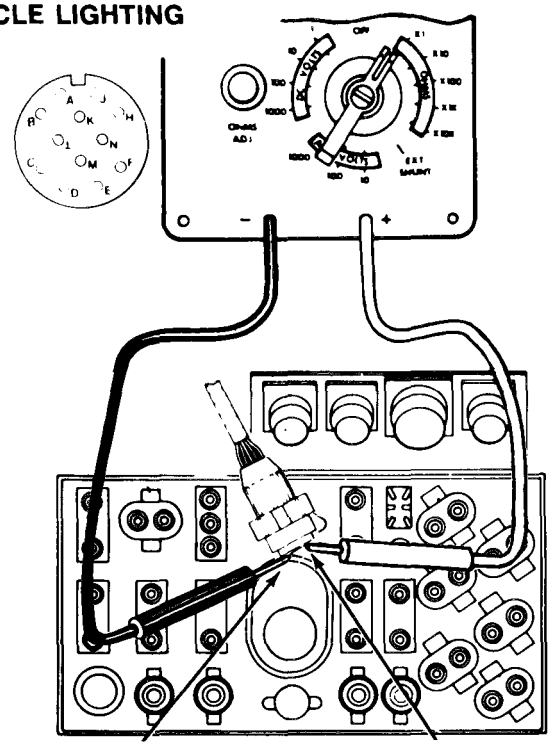
Symptom-61

14 **Check basket-light switch harness (CKT 75) connector at LIGHTING CONTROL switch for continuity from contact A to contact K.**

Second Technician (Operator's Station)

- Connect basket-light switch harness connector to master cylinder stoplight switch.
- Displace master control panel (page 10-33).
- Disconnect basket-light switch harness connector from LIGHTING CONTROL switch connector on master control panel.
- Connect two probes of meter to contacts A and K (CKT 75) of basket-light switch harness connector at LIGHTING CONTROL switch.
- Press and hold brake pedal.
- Check if meter indicates continuity while brake pedal is pressed.

Does meter indicate continuity?



MASTER CONTROL PANEL
(REAR VIEW)

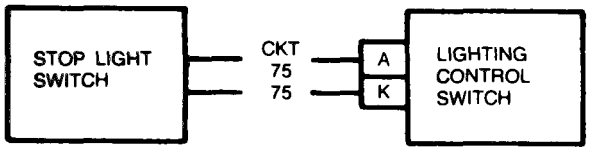
YES

15 **Replace LIGHTING CONTROL switch (page 10-54).**

NO

16

- **Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 75 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of defective basket-light switch harness.**
- **Connect basket-light switch harness to LIGHTING CONTROL switch.**
- **Install master control panel (page 10-33).**



TA250506

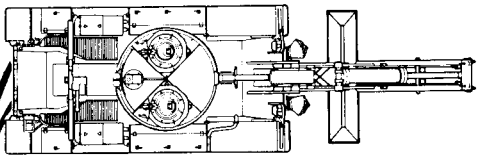
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING

Symptom-62

BLACKOUT STOPLIGHT WILL NOT LIGHT.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



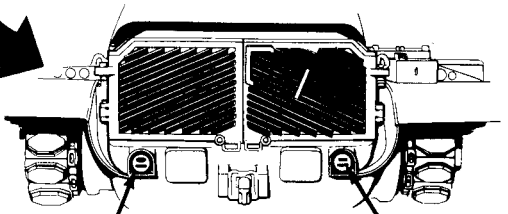
1 **Check if service stoplight will light.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- On LIGHTING CONTROL switch, turn LIGHTING CONTROL lever to STOPLIGHT.
- Press and hold brake pedal.

First Technician (Rear Grille Doors)

- Visually check if service stoplight lights when brake pedal is pressed.

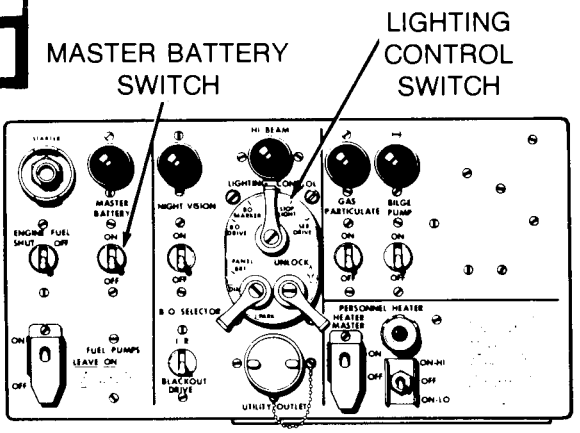


Does service stoplight light?

NO

2
- **Check stoplight switch at brake master cylinder for continuity.**
- **See Step (12).**

YES



MASTER CONTROL PANEL

TA250507

Symptom-62

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

3 **Check rear accessory harness (CKT 23) at right taillight assembly for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First and Second Technician (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

First Technician (Rear Grille Doors)

- Disconnect rear accessory harness connector (CKT 23) from right taillight assembly.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to rear accessory harness connector (CKT 23) and black probe to ground.

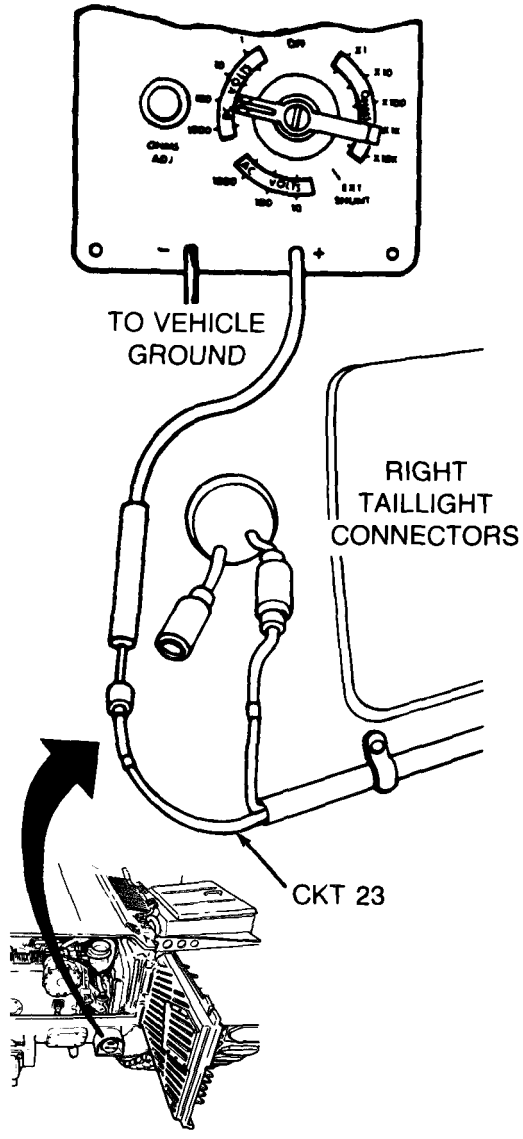
Second Technician (Operator's Station)

- On LIGHTING CONTROL switch turn LIGHTING CONTROL lever to B.O. MARKER.
- Set MASTER BATTERY switch ON.
- Press and hold brake pedal.

First Technician (Rear Grille Doors)

- Check if meter indicates 18 to 30 volts dc while brake pedal is pressed.

Does meter indicate 18 to 30 volts dc?



NO

YES

4 **Replace socket and wiring assembly in right taillight (page 10-298).**

TA250508

Symptom-62

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

5 **Check front accessory harness (CKT 23) at bulkhead disconnect for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Rear Grille Doors)

- Connect rear accessory harness (CKT 23) to right taillight assembly.

First and Second Technician (Rear Grille Doors)

- Install transmission shroud (page 9-6).

First Technician (Commander's Station)

- Displace front accessory harness connector (CKT 23) at bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact C (CKT 23) of front accessory harness connector and black probe to ground.

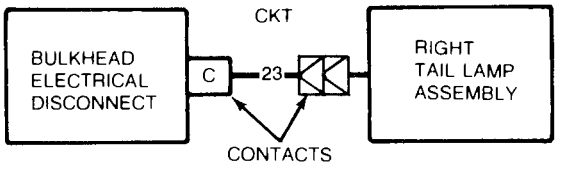
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and hold brake pedal.

First Technician (Commander's Station)

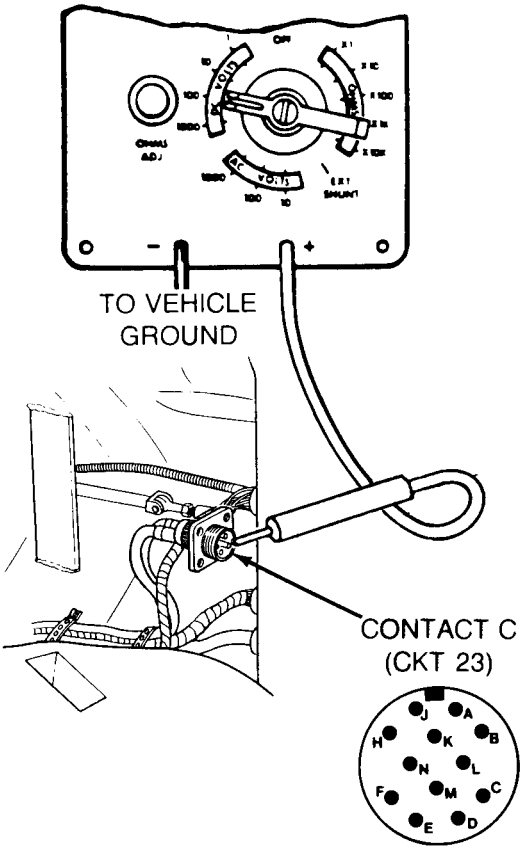
- Check if meter indicates 18 to 30 volts dc while brake pedal is pressed.

Does meter indicate 18 to 30 volts dc?



NO

YES



BULKHEAD DISCONNECTS AT COMMANDER'S STATION

6

- **Inspect rear accessory harness for bent/broken connector contacts or loose CKT 23 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective rear accessory harness.**
- **Install front accessory harness connector at bulkhead disconnects (page 10-270).**

TA250509

Symptom-62

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

7 **Check basket-light switch harness (CKT 23) at the basket disconnect for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Install front accessory harness connector (CKT 23) at bulkhead disconnect (page 10-270).
- Displace basket-light switch harness connector (CKT 23) at basket disconnect.
- Connect red probe of meter to contact N (CKT 23) of basket-light switch harness connector and black probe to ground.

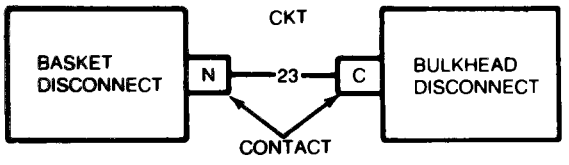
Second Technician (Commander's Station)

- Set MASTER BATTERY switch ON.
- Press and hold brake pedal.

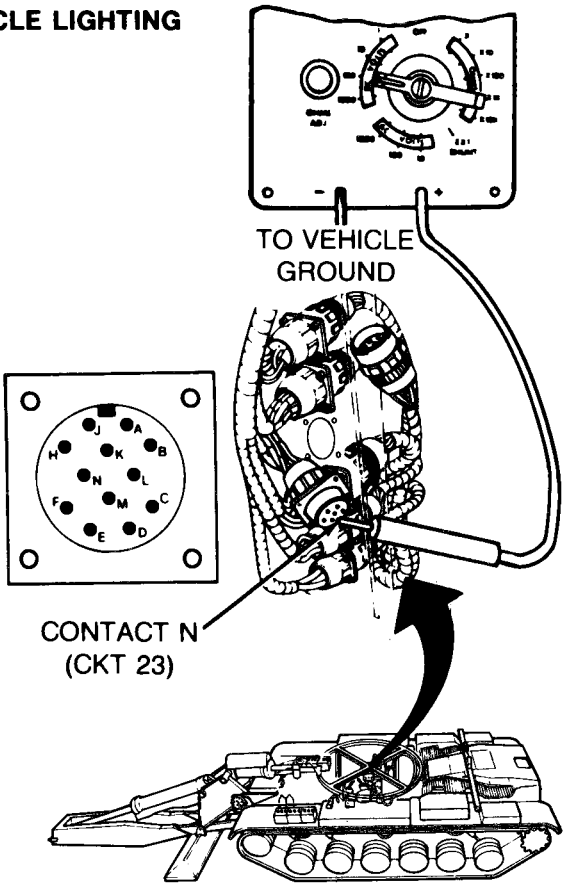
First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc while the brake pedal is pressed.

Does meter indicate 18 to 30 volts dc?



NO — YES



8

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 23 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Install basket-light switch harness connector at basket disconnect.**

TA250510

Symptom-62

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

9 **Check basket-light switch harness (CKT 23) for continuity from basket disconnect to connector at LIGHTING CONTROL switch.**

Second Technician (Operator's Station)

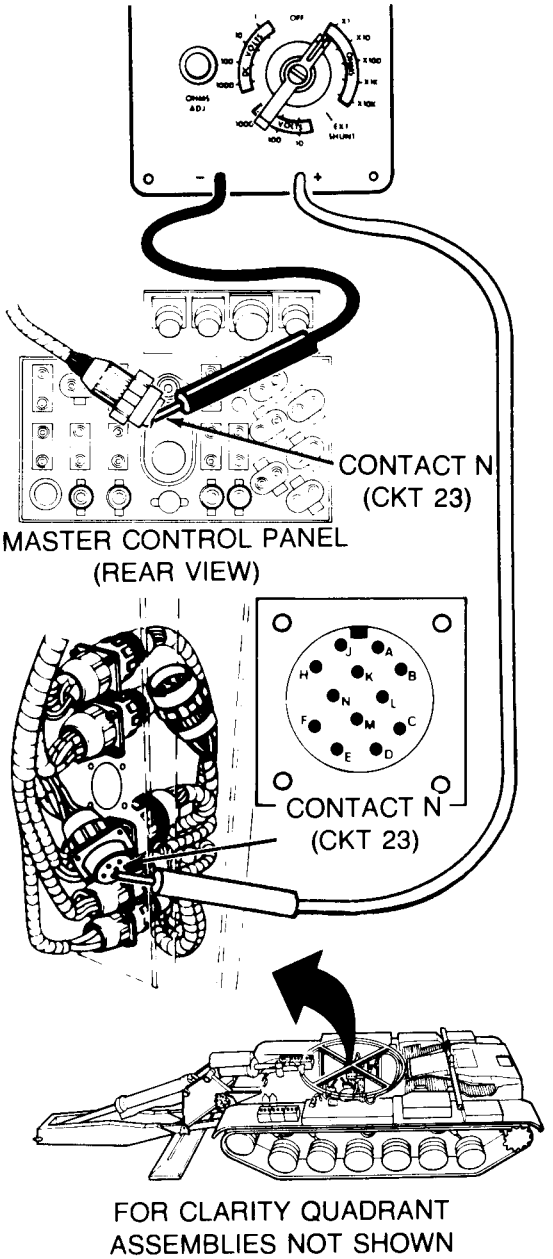
- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-light switch harness connector from LIGHTING CONTROL switch on master control panel.

First Technician (Commander's Station)

- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-81).

Second Technician (Operator's Station)

- Connect red probe of meter to contact N (CKT 23) of basket-light switch harness connector at LIGHTING CONTROL switch.



TA250511

Symptom-62 **DETAILED TROUBLESHOOTING PROCEDURE**
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

STEP (9) CONTINUED

First Technician (Commander's Station)

- Connect black probe of meter to contact N (CKT 23) of basket-light switch harness connector at basket disconnect.
- Check if meter indicates continuity.

Does meter indicate continuity?

NO

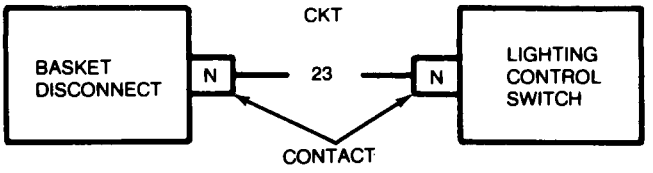
10

- **Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 23 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of defective basket-light switch harness.**
- **Install basket-light switch harness connector at basket disconnect.**
- **Connect basket-light switch harness connector to LIGHTING CONTROL switch.**
- **Install master control panel (page 10-33).**

YES

11

- **Replace LIGHTING CONTROL switch (page 10-54).**
- **Install basket-light switch harness connector at basket disconnect.**



TA250512

Symptom-62

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

FROM STEP (2)

(12) Check stoplight switch at brake master cylinder for continuity.

Second Technician (Operator's Station)

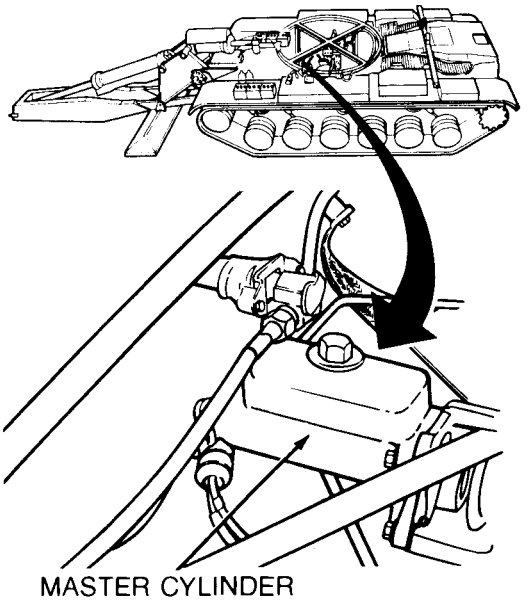
- Set MASTER BATTERY switch OFF.
- Disconnect basket-light switch harness connector from master cylinder stoplight switch.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect two probes of meter to the two contacts of stoplight switch.
- Press and hold brake pedal.
- Check if meter indicates continuity while brake pedal is pressed.

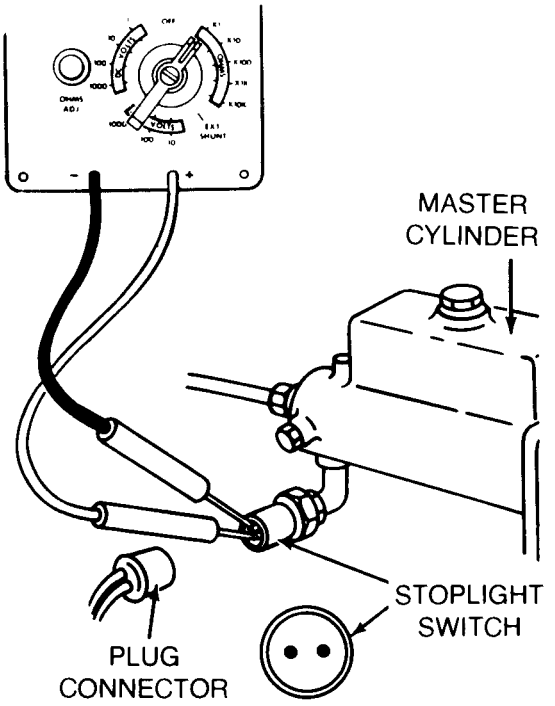
Does meter indicate continuity?

(13) Replace stoplight switch (page 13-31). — NO

YES

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN





TA250513

Symptom-62

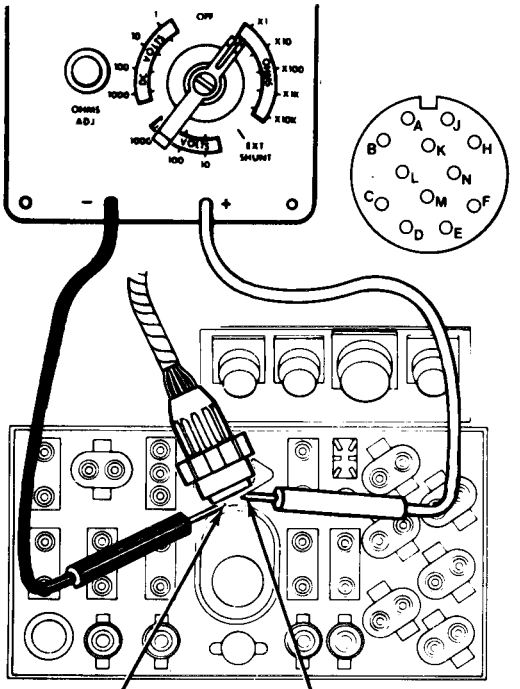
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

14 **Check basket-light switch harness (CKT 75) connector at LIGHTING CONTROL switch for continuity from contact A to contact K.**

Second Technician (Operator's Station)

- Connect basket-light switch harness connector to master cylinder stoplight switch.
- Displace master control panel (page 10-33).
- Disconnect basket-light switch harness connector from LIGHTING CONTROL switch on master control panel.
- Connect probes of meter to contacts A and K (CKT 75) of basket-light switch harness connector at LIGHTING CONTROL switch.
- Press and hold brake pedal.
- Check if meter indicates continuity while brake pedal is pressed.

Does meter indicate continuity?



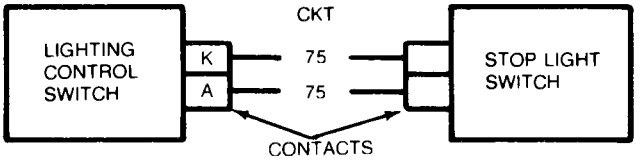
YES

15 **Replace LIGHTING CONTROL switch (page 10-54).**

NO

16

- **Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 75 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of defective basket-light switch harness.**
- **Install master control panel (page 10-33).**



TA250514

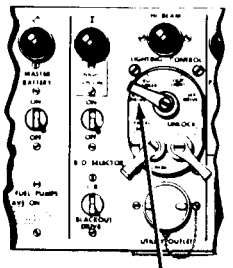
Symptom-63

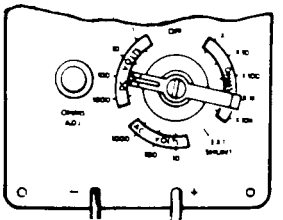
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING

BO DRIVE LAMP WILL NOT LIGHT (IR SERVICE LAMPS WILL LIGHT).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.





1 **Check left headlight base harness (CKT 19) connector for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set BO SELECTOR switch to BLACKOUT DRIVE.
- Turn LIGHTING CONTROL switch lever to BO DRIVE.

First Technician (Left Front of Vehicle)

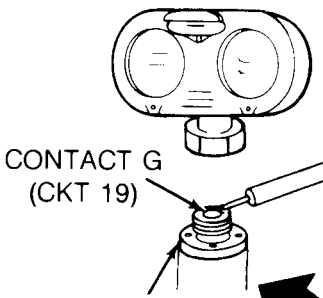
- Disconnect left headlight assembly from dual base harness connector.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact G (CKT 19) of dual base harness connector and black probe to ground.

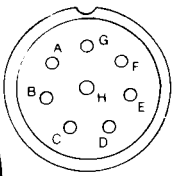
Second Technician (Operator's Station)

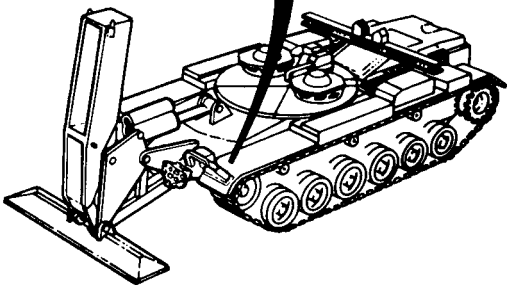
- Set MASTER BATTERY switch ON.

First Technician (Left Front of Vehicle)

- Check if meter indicates 18 to 30 volts dc.







Does meter indicate 18 to 30 volts dc?

NO — YES

2 **Replace left headlight assembly (page 10-172).**

TA250515

Symptom-63

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

3 Check front accessory harness (CKT 19) at connector to headlight base harness for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Left Front of Vehicle)

- Connect left headlight assembly to dual base harness connector.

Second Technician (Operator's Station)

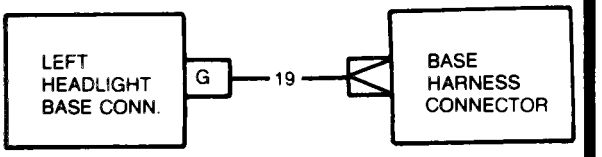
- Disconnect connector (CKT 19) of front accessory harness from headlight base harness (located inside crew compartment).
- Connect red probe of meter to front accessory harness connector (CKT 19) and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

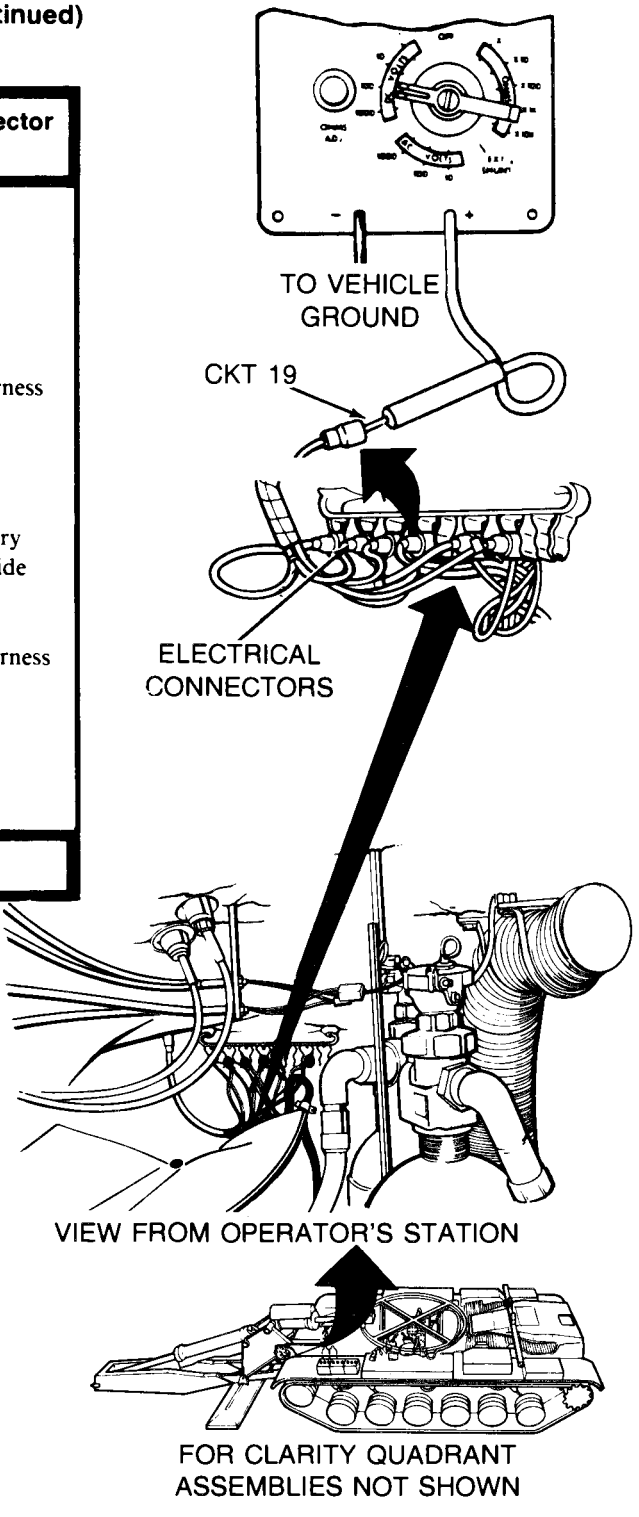
Does meter indicate 18 to 30 volts dc?

4 Repair left headlight base harness (page 10-186).

YES

NO

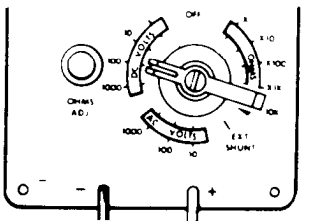


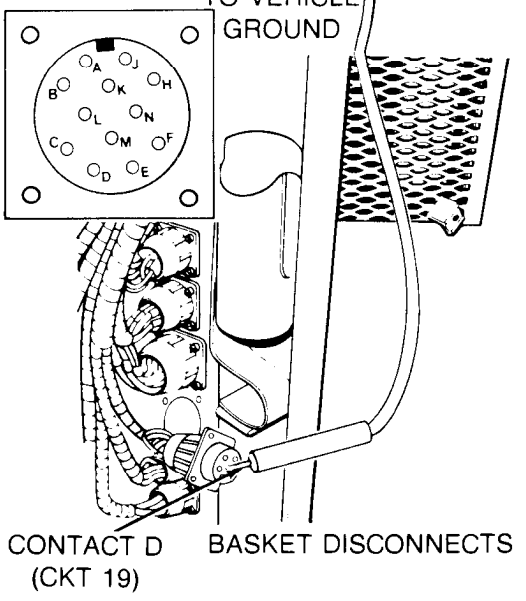


TA250516

Symptom-63

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)





5 **Check basket-control panel accessories harness (CKT 14) at basket disconnect for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Connect connector (CKT 19) of front accessory harness to headlight base harness.

First Technician (Commander's Station)

- Displace basket-control panel accessories harness (CKT 19) from basket disconnect.
- Connect red probe of meter to contact D (CKT 19) of basket-control panel accessories harness connector and black probe to ground.

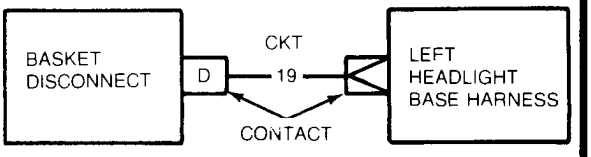
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



NO

YES

6

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 19 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Install basket-control panel accessories harness connector at basket disconnect.**

TA250517

Symptom-63

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

7 **Check master control panel accessories harness (CKT 19) panel connector for electrical power.**

Second Technician (Operator's Station).

- Set MASTER BATTERY switch OFF.

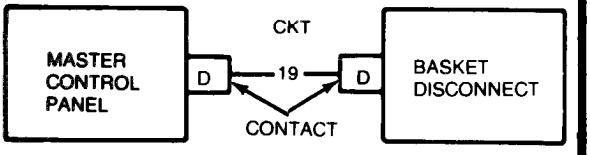
First Technician (Operator's Station)

- Install basket-control panel accessories harness connector at basket disconnect.

Second Technician (Operator's Station)

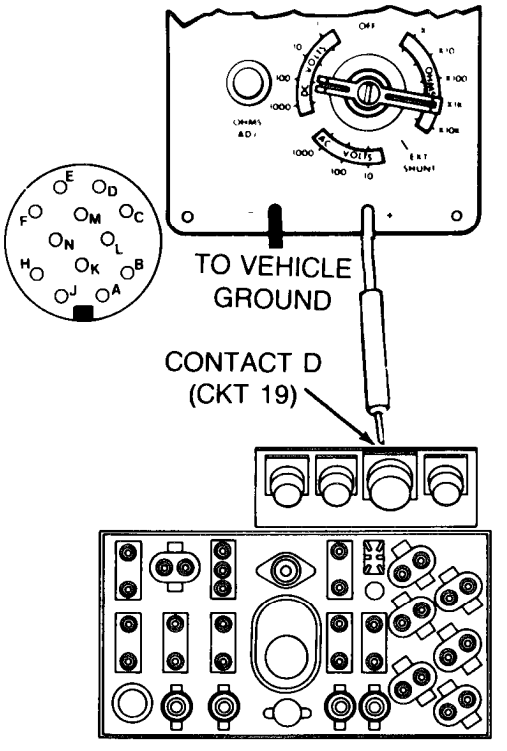
- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness connector from master control panel.
- Connect red probe of meter to contact D (CKT 19) of master control panel accessories harness panel connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



NO

YES



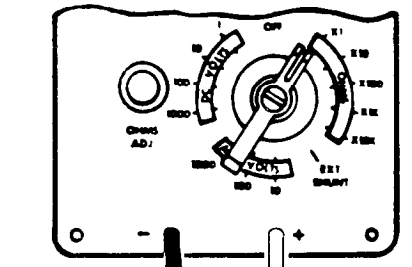
8

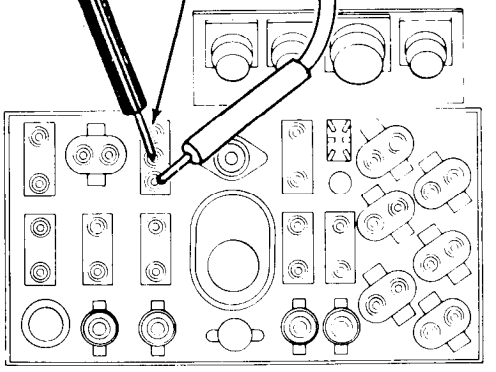
- **Inspect basket-control panel accessories harness for bent/ broken connector contacts or loose CKT 19 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-control panel accessories harness.**
- **Install basket-control panel accessories harness connector at basket disconnect.**
- **Install master control panel (page 10-33).**

TA250518

Symptom-63

DETAILED TROUBLESHOOTING PROCEDURE SUPPORT SYSTEM - VEHICLE LIGHTING (Continued)





9 Check BO SELECTOR switch for continuity.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Connect basket-control panel accessories harness connector to master control panel.
- Disconnect two connectors (CKT 19) from BO SELECTOR switch.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect probes of meter to contacts (CKT 19) of BO SELECTOR switch.
- Check if meter indicates continuity.

Does meter indicate continuity?

YES → **10 Replace master control panel accessories harness (page 10-91).**

NO → **11 Replace BO SELECTOR switch (page 10-58).**

TA250519

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING

Symptom-64

BOTH BLACKOUT TAILLIGHTS AND/OR BOTH BLACKOUT MARKER LIGHTS WILL NOT LIGHT.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 **Check if both blackout marker lamps will light.**

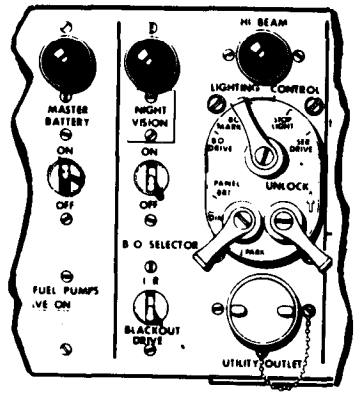
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Turn LIGHTING CONTROL switch to B.O. MARKER.

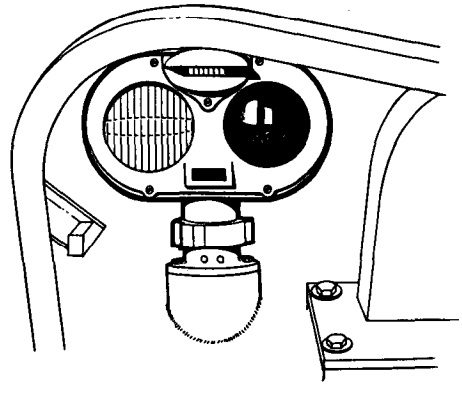
First Technician (Front of Vehicle)

- Visually check if blackout marker lamps on both headlights are lit.

Are B.O. marker lamps in both headlight assemblies lit?



MASTER CONTROL PANEL



BLACKOUT MARKER LAMP
(LEFT SIDE SHOWN)

NO

YES

2

- **Check front accessory harness connector (CKT 24) at bulkhead disconnect for electrical power.**
- **See Step (10)**

TA250520

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

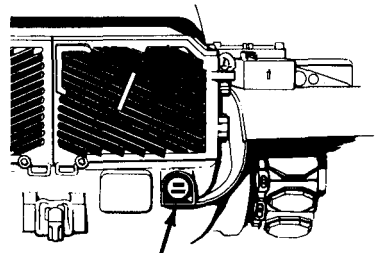
Symptom-64

3 **Check if both blackout taillights will light.**

First Technician (Rear of Vehicle)

Visually check if both blackout taillight lamps are lit.

Are blackout taillight lamps in both taillight assemblies lit?



BLACKOUT TAILLIGHT
(RIGHT SIDE SHOWN)

NO

YES

4 **Notify support maintenance of a defective front accessory harness.**

TA250521

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

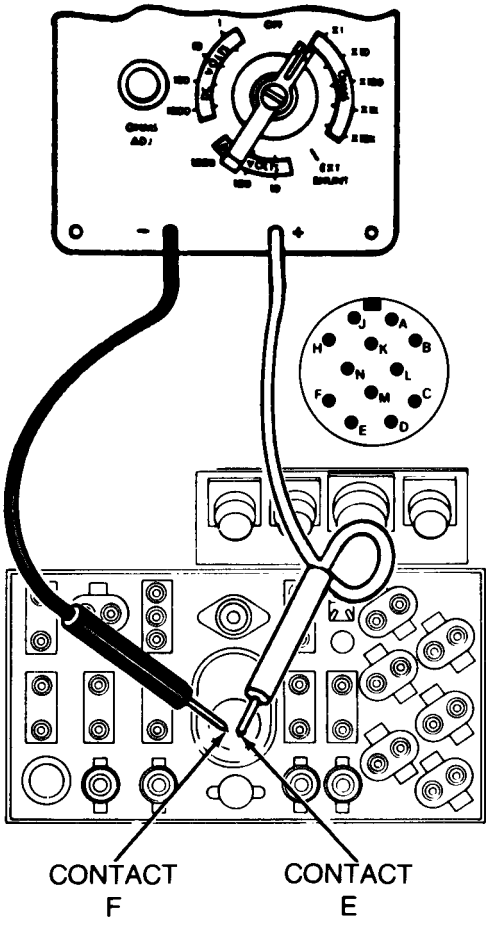
Symptom-64

5 **Check LIGHTING CONTROL switch for continuity from connector contact E to connector contact F (CKT 20-24).**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-light switch harness connector from LIGHTING CONTROL switch.
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact E of LIGHTING CONTROL switch.
- Connect black probe of meter to contact F of LIGHTING CONTROL switch.
- Check if meter indicates continuity.

Does meter indicate continuity?



MASTER CONTROL PANEL
(REAR VIEW)

YES

NO

6 **Replace LIGHTING CONTROL switch (page 10-54).**

TA250522

Symptom-64

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

7 **Check basket-light switch harness (CKT 20-24) from LIGHTING CONTROL switch to basket disconnect for continuity.**

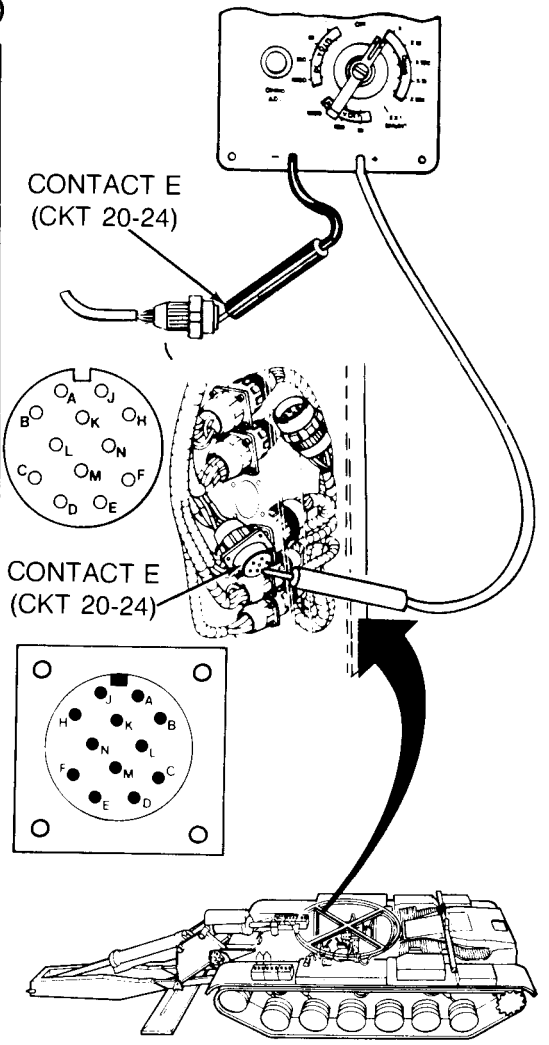
First Technician (Commander's Station)

- Displace basket-light switch harness connector (CKT 20-24) from basket disconnect.
- Connect red probe of meter to contact E (CKT 20-24) of basket-light switch harness connector at basket disconnect.

Second Technician (Operator's Station)

- Connect black probe to contact E (CKT 20-24) of basket-light switch harness connector at LIGHTING CONTROL switch.
- Check if meter indicates continuity.

Does meter indicate continuity.

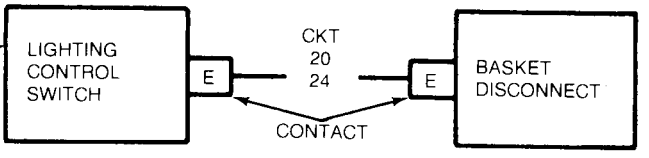


8
- **Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 20-24 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-light switch harness.**
- **Install basket-light switch harness connector at basket disconnect.**
- **Connect basket-light switch harness connector to LIGHTING CONTROL switch.**
- **Install master control panel (page 10-33).**

NO

YES

9 **Replace LIGHTING CONTROL switch (page 10-54).**



TA250523

Symptom-64

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

FROM STEP (2)

10 Check front accessory harness connector (CKT 24) at bulkhead disconnect for electrical power.

Second Technician (Operator's Station)

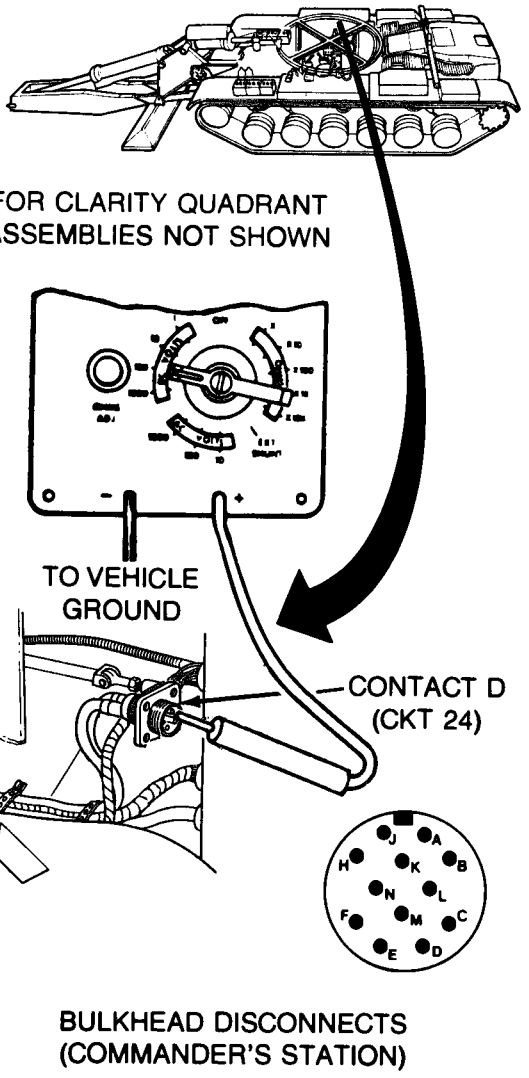
- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Displace front accessory harness connector (CKT 24) at bulkhead disconnect (page 10-269).
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact D (CKT 24) of front accessory harness connector and black probe to ground.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.



BULKHEAD DISCONNECTS (COMMANDER'S STATION)

TA250524

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

Symptom-64

STEP (10) CONTINUED

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc.

NO

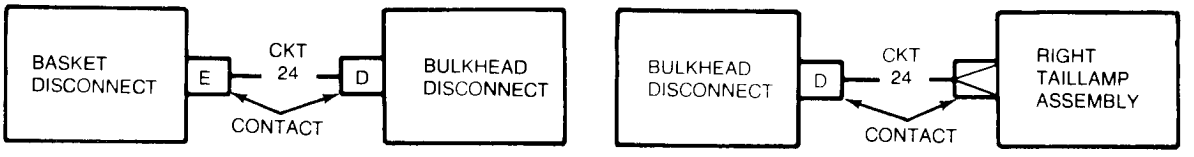
(11)

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 24 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**

YES

(12)

- **Inspect rear accessory harness for bent/broken connector contacts or loose CKT 24 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective rear accessory harness.**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**



TA250525

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING

Symptom-65

ONE HEADLIGHT BLACKOUT MARKER LAMP OR ONE TAILLIGHT BLACKOUT MARKER LAMP WILL NOT LIGHT.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

(1) Check if one headlight blackout marker lamp or one taillight blackout marker lamp is not working.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- On LIGHTING CONTROL switch, turn LIGHTING CONTROL lever to B.O. MARKER.

First Technician (Front of Vehicle)

- Visually check headlights to see if one blackout marker lamp is not lit.

First Technician (Rear of Vehicle)

- Visually check taillights to see if one blackout marker lamp is not lit.

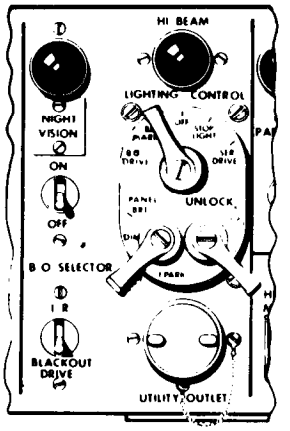
Is one headlight blackout marker lamp or one taillight blackout marker lamp not lit?

(2)

- **Check headlight base harness connector (CKT 20), at headlight assembly that does not work, for electrical power.**
- **See Step (6).**

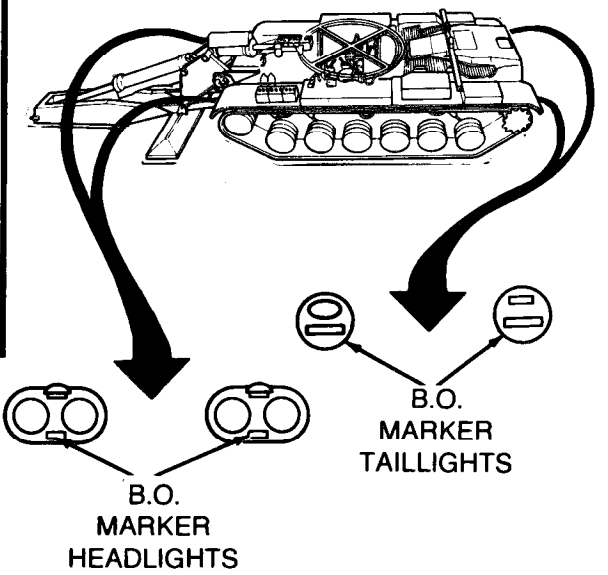
HEAD LIGHT

TAIL LIGHT



MASTER CONTROL PANEL

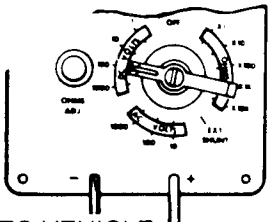
FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



TA250526

Symptom-65

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)



3 **Check rear accessory harness (CKT 24) at taillight that does not work for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First and Second Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

First Technician (Rear Grille Doors)

- Disconnect rear accessory harness connector (CKT 24) from taillight assembly that does not work.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to rear accessory harness (CKT 24) connector and black probe to ground.

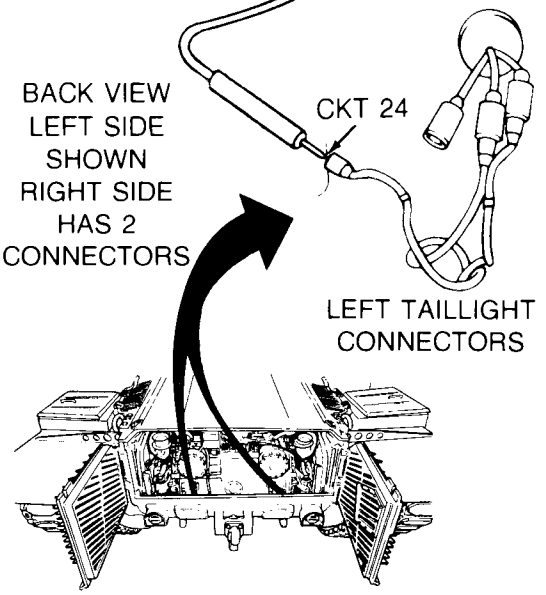
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Rear Grille Doors)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



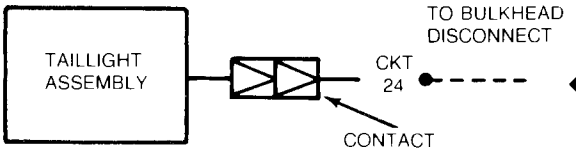
4 **Replace socket and wiring assembly (page 10-298).**

YES

NO

5

- **Inspect rear accessory harness for bent/broken connector contact or loose CKT 24 wire at rear of connector.**
- **Repair connector if defective (page 10-298).**
- **If connector is not defective, notify support maintenance of a defective rear accessory harness.**
- **Connect rear accessory harness connector (CKT 24) to taillight assembly.**
- **Install transmission shroud (page 9-6).**



TA250527

Symptom-65 **DETAILED TROUBLESHOOTING PROCEDURE**
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

FROM STEP 2

6 Check headlight base harness connector (CKT 20), at headlight assembly that does not work, for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Front of Vehicle)

- Remove headlight assembly that does not work (page 10-172).
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact F (CKT 20) of headlight base harness connector and black probe to ground.

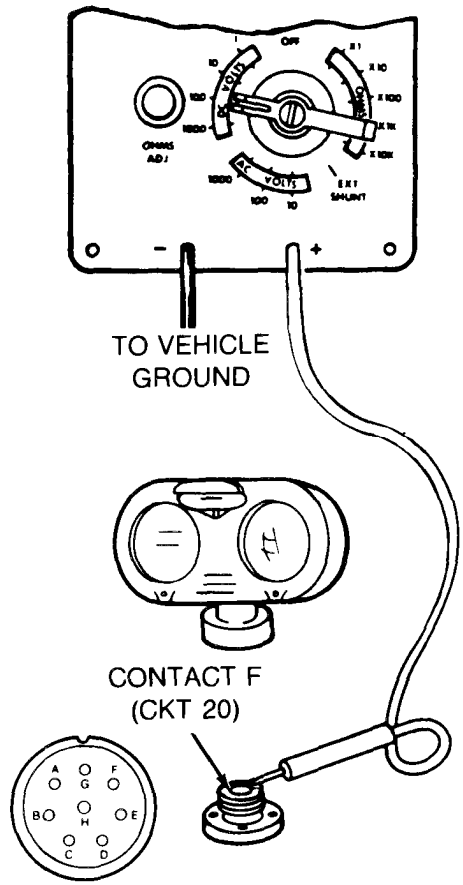
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Front of Vehicle)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



HEADLIGHT BASE HARNESS CONNECTOR

NO

YES

7 Replace headlight assembly (page 10-172).

TA250528

Symptom-65

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

8 **Check front accessory harness (CKT 20) at headlight base harness to headlight assembly that does not work, for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

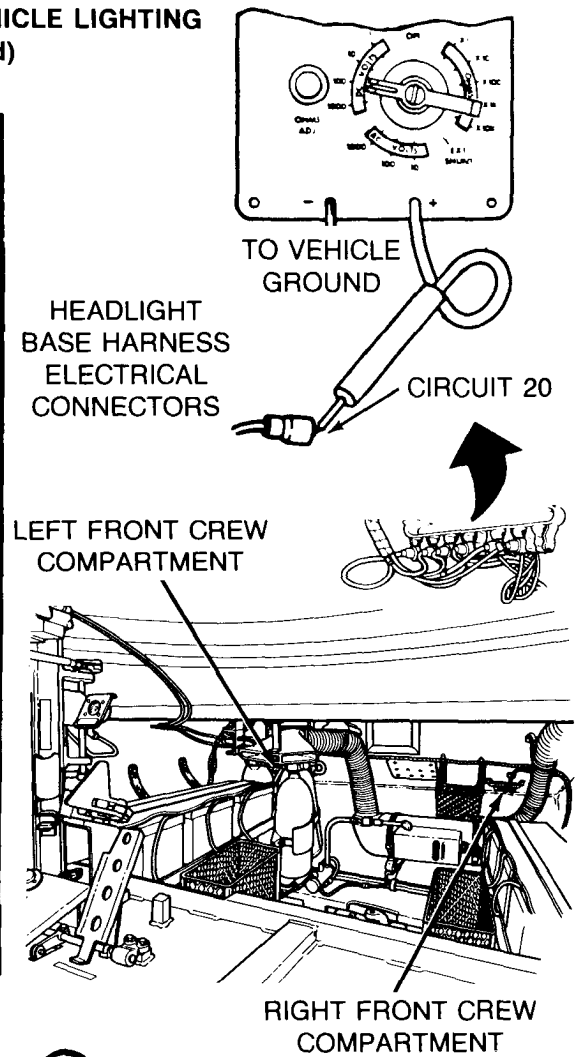
First Technician (Front of Vehicle)

- Connect headlight assembly to headlight base harness connector.

Second Technician (Front of Crew Compartment)

- Disconnect connector (CKT 20) of front accessory harness from headlight base harness, of defective headlight.
- Connect red probe of meter to front accessory harness (CKT 20) connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



YES

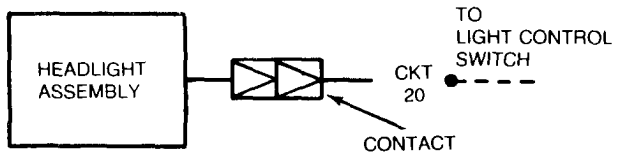
9

- **Repair headlight base harness (CKT 20) (page 10-186).**

NO

10

- **Inspect front accessory harness for bent/broken connector contact or loose CKT 20 wire at rear of connector.**
- **Repair connector if defective (page 10-298).**
- **If connector is not defective, notify support maintenance of defective front accessory harness.**
- **Connect front accessory harness to headlight base harness.**



TA250529

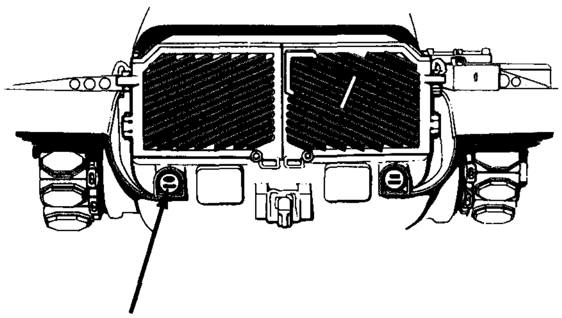
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING

Symptom-66

HIGH BEAM OR LOW BEAM, IN ONE SERVICE HEADLIGHT LAMP WILL NOT LIGHT, OR SERVICE TAILLIGHT WILL NOT LIGHT (PANEL LIGHT SWITCH, AT BRIGHT, DIM, OR OFF).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



(1) **Check if service taillight will light.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set LIGHTING CONTROL switch to SER DRIVE and PANEL switch to BRT.

Second Technician (Rear of Vehicle)

- Visually check if service taillight is working.

Does service taillight light?

NO

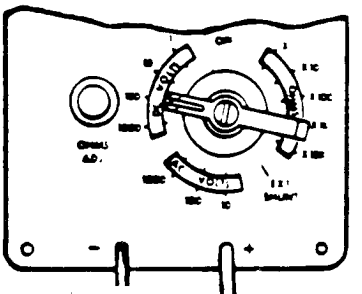
YES

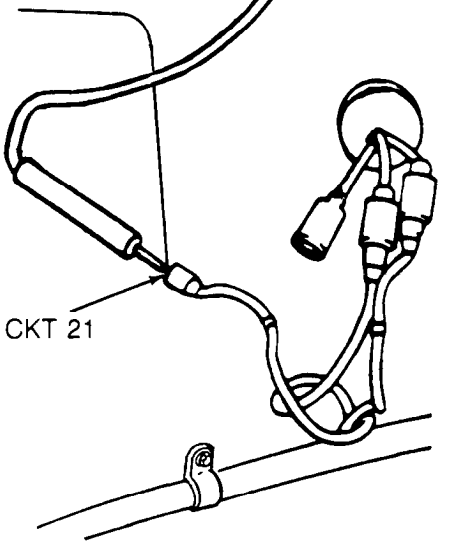
(2)
- **Check if high beam or low beam in bad service headlight lamp will not light.**
- **See Step (12)**

TA250530

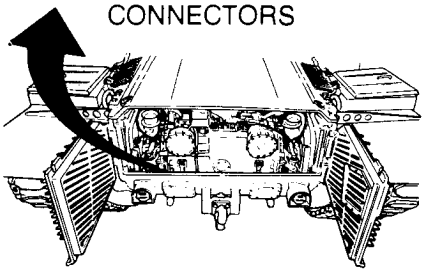
Symptom-66

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)





BACKVIEW - LEFT TAILLIGHT CONNECTORS



3 **Check rear accessory harness connector (CKT 21) at left taillight for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First and Second Technicians (Rear Grille Doors)

- Remove transmission shroud (page 9-2).

First Technician (Rear Grille Doors)

- Disconnect rear accessory harness connector (CKT 21) from left taillight assembly.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to rear accessory harness connector (CKT 21) and black probe to vehicle ground.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Rear Grille Doors)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

NO

YES

4 **Replace socket and wiring assembly in left taillight (page 10-207).**

TA250531

Symptom-66

DETAILED TROUBLESHOOTING PROCEDURE SUPPORT SYSTEM - VEHICLE LIGHTING (Continued)

5 **Check front accessory harness connector (CKT 21) at bulkhead disconnect for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Rear Grille Doors)

- Connect rear accessory harness connector (CKT 21) to left taillamp assembly.

First and Second Technicians (Rear Grille Doors)

- Install transmission shroud (page 9-6).

First Technician (Commander's Station)

- Displace front accessory harness connector (CKT 21) from bulkhead disconnect (page 10-269).
- Connect red probe of meter to contact A (CKT 21) of front accessory harness connector at bulkhead disconnect, and black probe to ground.

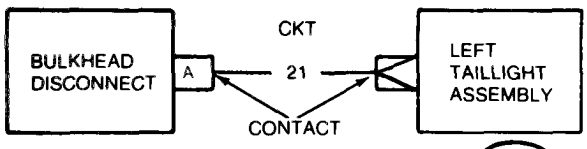
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

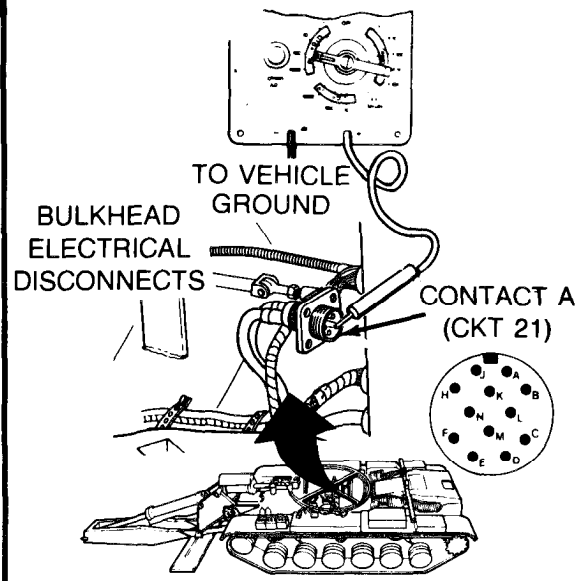
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



YES

NO



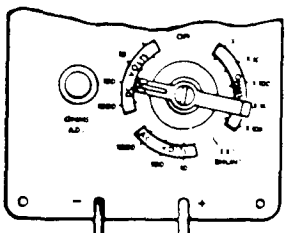
6

- **Inspect rear accessory harness for bent/broken connector contacts or loose CKT 21 wire at rear of connectors.**
- **Repair connectors if defective. (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective rear accessory harness.**
- **Install front accessory harness connector at bulkhead disconnect (page 10-270).**

TA250532

Symptom-66

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)



TO VEHICLE GROUND

7 **Check basket-light switch harness connector (CKT 21) at basket disconnect for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

First Technician (Commander's Station)

- Install front accessory harness connector at bulkhead disconnect (page 10-270).
- Displace basket-light switch harness connector from basket disconnect.
- Connect red probe of meter to contact "H" (CKT 21) of basket-control panel harness connector at basket disconnect, and black probe to ground.

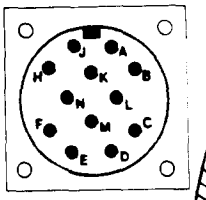
Second Technician (Operator's Station)

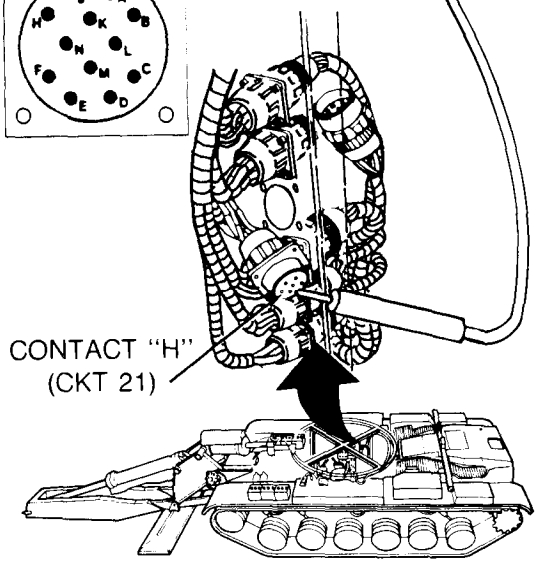
- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

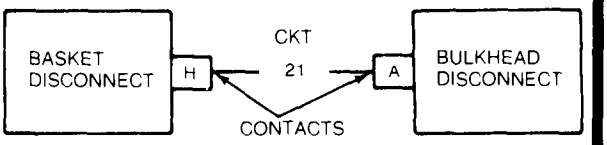
Does meter indicate 18 to 30 volts dc?





CONTACT "H" (CKT 21)

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



YES

NO

8

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 21 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessories harness.**
- **Install basket-light switch harness connector at basket disconnect.**

TA250533

Symptom-66

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

9 Check basket-light switch harness (CKT 21) for continuity from connector at basket disconnect to connector at LIGHTING CONTROL switch.

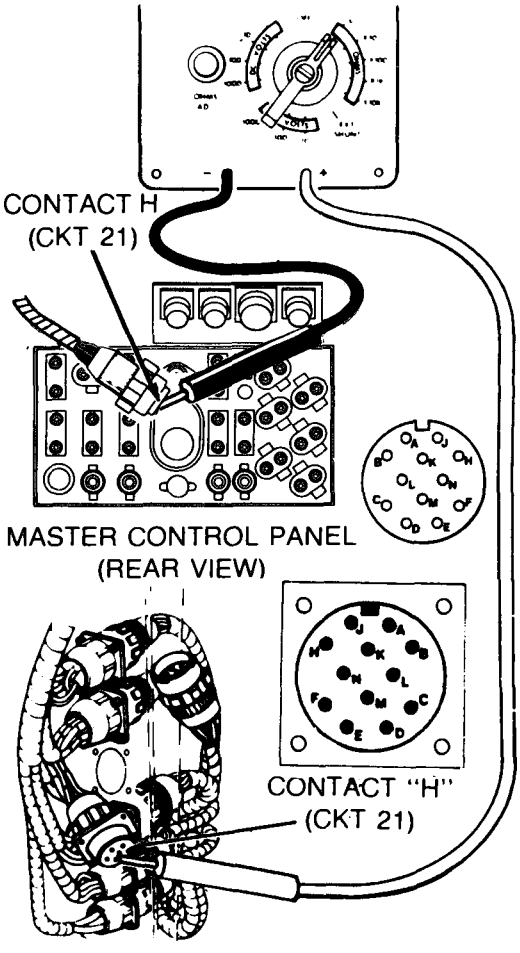
Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket light switch harness connector from LIGHTING CONTROL switch on master control panel.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect black probe of meter to contact H (CKT 21) of basket-light switch harness connector at LIGHTING CONTROL switch.

First Technician (Commander's Station)

- Connect red probe of meter to contact H (CKT 21) of basket-light switch harness connector at basket disconnect.

Second Technician (Operator's Station)



TA250534

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

Symptom-66

STEP (9) CONTINUED

- Check if meter indicates continuity.

Does meter indicate continuity?

NO

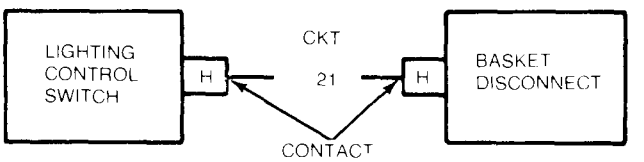
10

- **Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 21 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-light switch harness.**
- **Connect basket-light switch harness connector to LIGHTING CONTROL switch at master control panel.**
- **Install basket-light switch harness connector at basket disconnect.**
- **Install master control panel (page 10-33).**

YES

11

- **Replace LIGHTING CONTROL switch (page 10-54).**
- **Install basket-light switch harness connector at basket disconnect.**



TA250535

Symptom-66

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

FROM STEP (2)

(12) Check if high beam or low beam in bad service headlight lamp will not light.

Second Technician (Front of Vehicle)

- Visually check if high beam or low beam in service headlight lamp will not light.

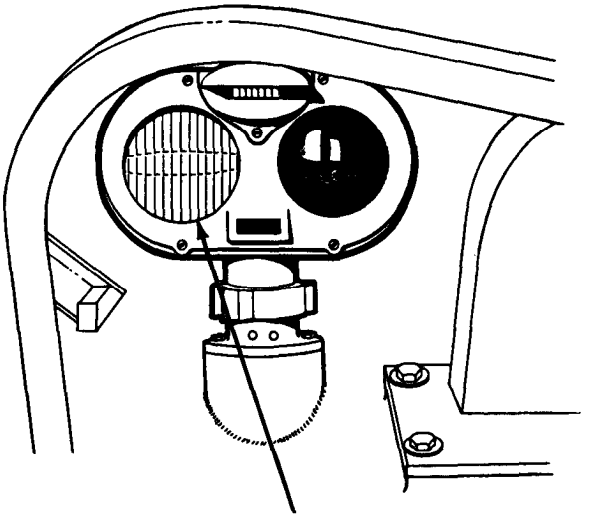
First Technician (Operator's Station)

- Press and release foot DIMMER SWITCH.

Second Technician (Front of Vehicle)

- Visually check if high beam or low beam in service headlight lamp will not light.

Which beam in service headlight lamp does not light?



SERVICE HEADLIGHT LAMP (LEFT SIDE SHOWN)

LOW

HIGH

(13)

- **Check dual headlight base harness connector (CKT 17) at bad service headlight for electrical power.**
- **See Step (19) .**

TA250536

Symptom-66

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

14 **Check dual headlight base harness (CKT 18) connector at bad service headlight for electrical power.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Front of Vehicle)

- Remove headlight assembly of bad service lamp (page 10-172).
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact A (CKT 18) of dual headlight base harness connector and black probe to ground.

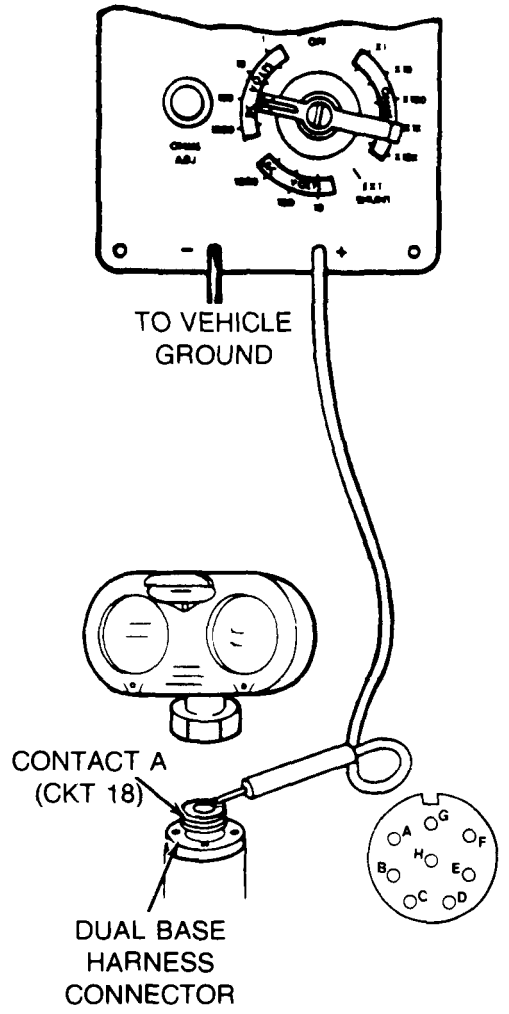
First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

Second Technician (Front of Vehicle)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts?



NO

YES

15 **Replace bad headlight assembly (page 10-172).**

TA250537

Symptom-66

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING (Continued)

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

NOTE

If the problem is with the left side service lamp check the left side intermediate connectors. If the problem is with the right side service lamp, check the right side intermediate connectors.

16 **Check front accessory harness (CKT 18) at intermediate connector for electrical power.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Front of Vehicle)

- Install headlight assembly (page 10-172).

Second Technician (Front of Crew Compartment)

- Disconnect intermediate connector (CKT 18) of front accessory harness from dual headlight base harness connector of bad service lamp.
- Connect red probe of meter to front accessory harness connector (CKT 18) of bad service lamp and black probe to ground.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

Second Technician (Front of Crew Compartment)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

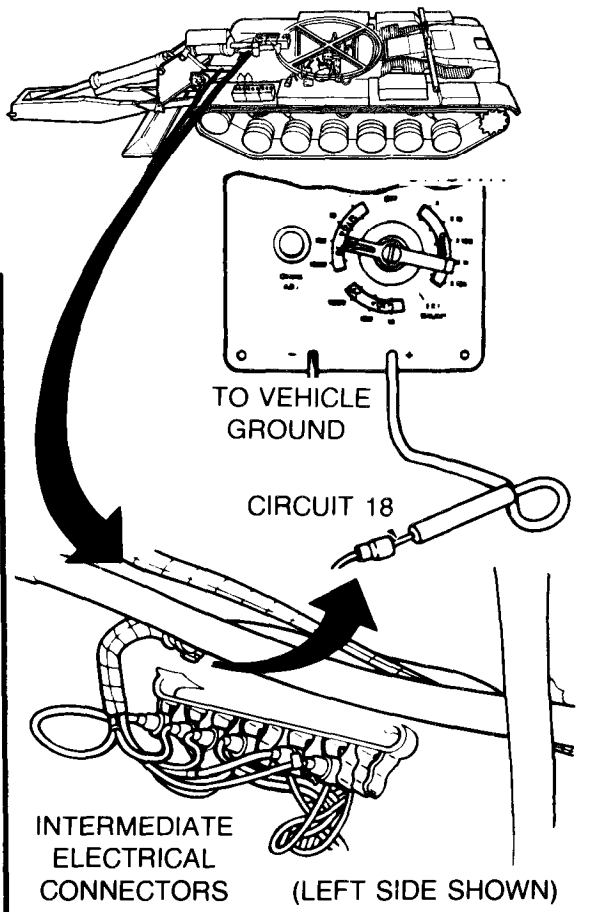
YES

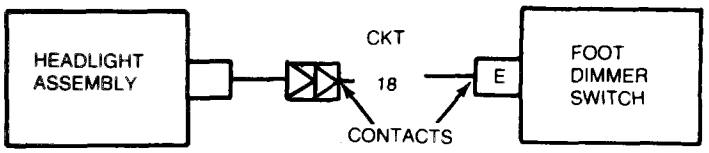
17 **Repair dual headlight base harness (page 10-298).**

NO

18

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 18 wire at rear of connectors.**
- **Repair connectors if defective. (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Connect front accessory harness intermediate connector.**





TA250538

Symptom-66

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

FROM STEP 13

19 Check dual headlight base harness connector (CKT 17) at bad service headlight for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Front of Vehicle)

- Remove headlight assembly of bad service lamp (page 10-172).
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact B (CKT 17) of dual headlight base harness connector and black probe to ground.

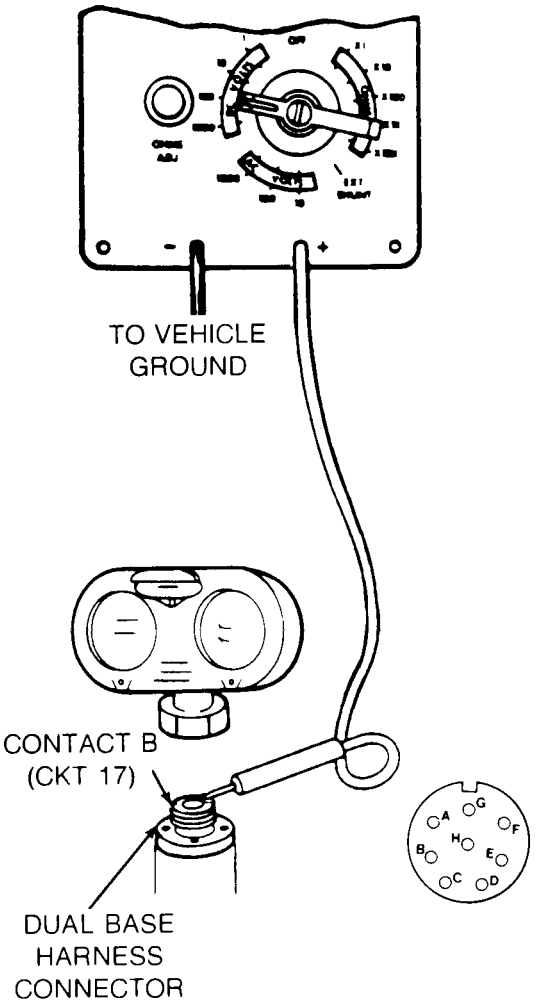
First Technician (Operator's Station)

- Set MASTER BATTERY switch to ON.

Second Technician (Front of Vehicle)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



NO

YES

20 Replace bad headlight assembly (page 10-172).

TA250539

Symptom-66

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

NOTE

If the problem is with the left side service lamp check the left side intermediate connectors. If the problem is with the right side service lamp, check the right side intermediate connectors.

21 **Check front accessory harness (CKT 17) at intermediate connector for electrical power.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Front of Vehicle)

- Install headlight assembly (page 10-172).

Second Technician (Front of Crew Compartment)

- Disconnect intermediate connector (CKT 17) of front accessory harness from dual headlight base harness connector of bad service lamp.
- Connect red probe of meter to front accessory harness connector (CKT 17) of bad service lamp and black probe to ground.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
  Second Technician (Front of Crew Compartment)
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

22 **Repair dual headlight base harness (page 10-298).**

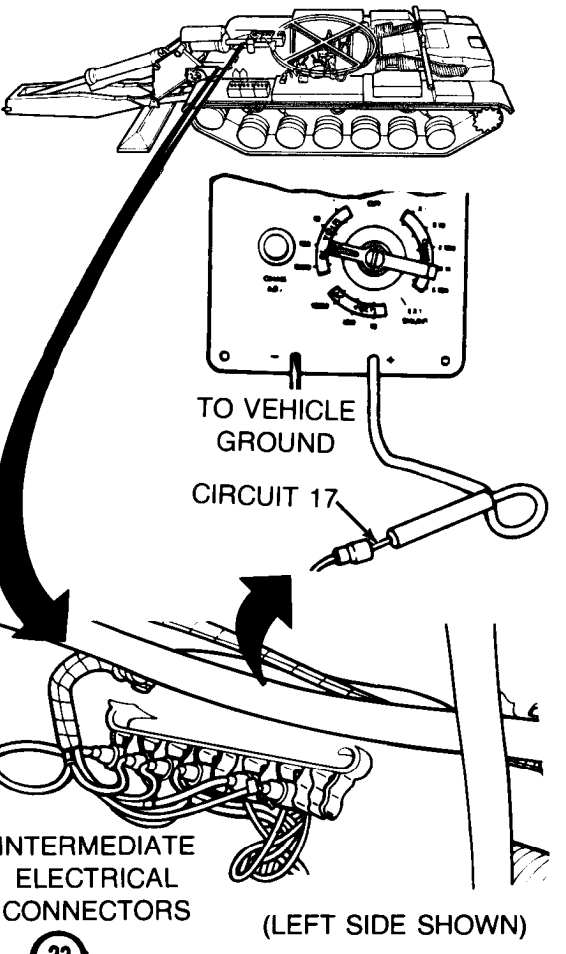
YES

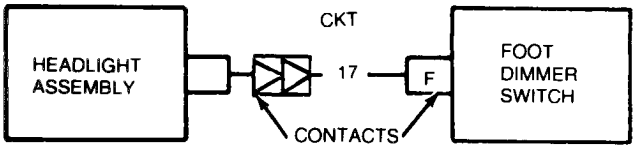
NO

23

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 17 wire at rear of connectors.**
- **Repair connectors if defective.**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Connect front accessory harness intermediate connector.**

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN





TA250540

DETAILED TROUBLESHOOTING PROCEDURE

Symptom-67 **SUPPORT SYSTEM - VEHICLE LIGHTING**

BOTH HIGH BEAM AND/OR BOTH LOW BEAM SERVICE LAMPS WILL NOT LIGHT (DIMMER SWITCH IN EITHER POSITION).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check front accessory harness (CKT 16) at foot DIMMER SWITCH for electrical power.

Second Technician (Operator's Station)

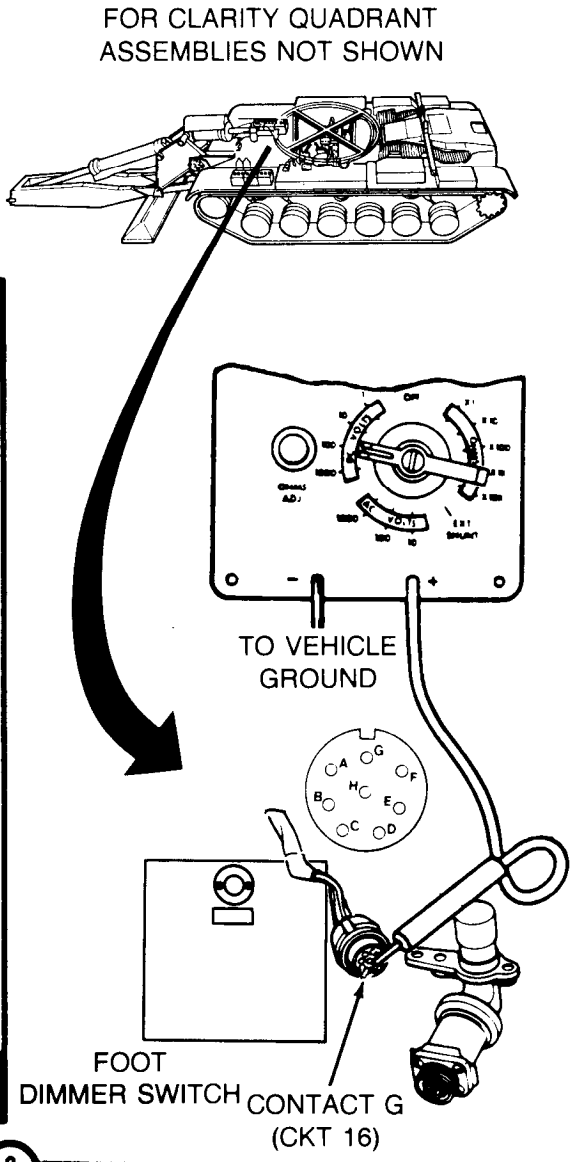
- Set MASTER BATTERY switch OFF.
- Remove foot DIMMER SWITCH (page 10-169).
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact G (CKT 16) of front accessory harness connector at foot DIMMER SWITCH and black probe to ground.
- Set LIGHTING CONTROL switch to SER DRIVE and PANEL light switch to BRT.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

YES — NO

2

- **Check basket-light switch harness connector (CKT 16) at basket disconnect for electrical power.**
- **See Step (10).**



TA250541

Symptom-67

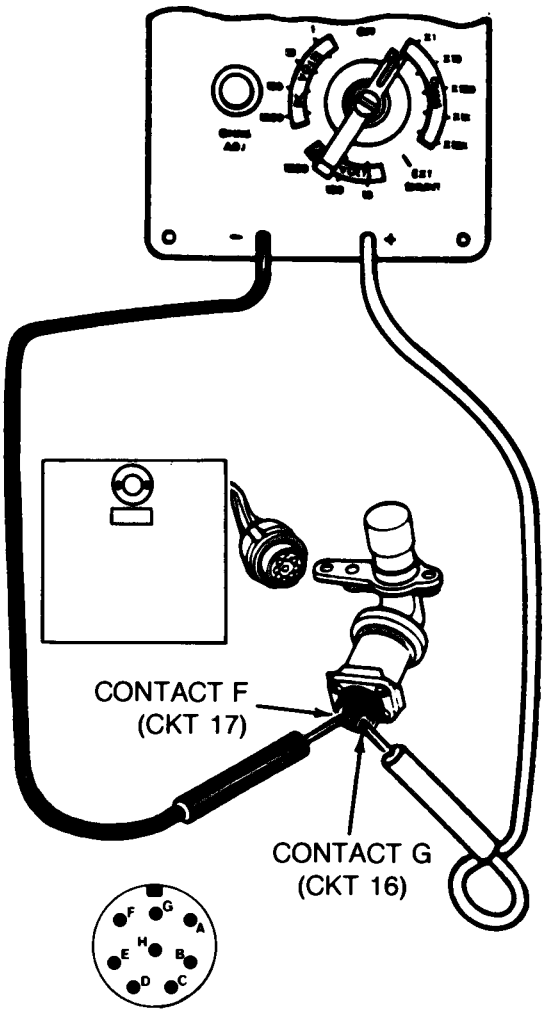
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

3 **Check foot DIMMER SWITCH for continuity from contact F to contact G in both switch positions.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact G (CKT 16) of foot DIMMER SWITCH.
- Connect black probe of meter to contact F (CKT 17) of foot DIMMER SWITCH.
- Check if meter indicates continuity.
- Press and release foot DIMMER SWITCH.
- Check if meter indicates continuity.

Does meter indicate continuity in one switch position only?



YES

NO

4 **Replace foot DIMMER SWITCH (page 10-169).**

TA250542

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

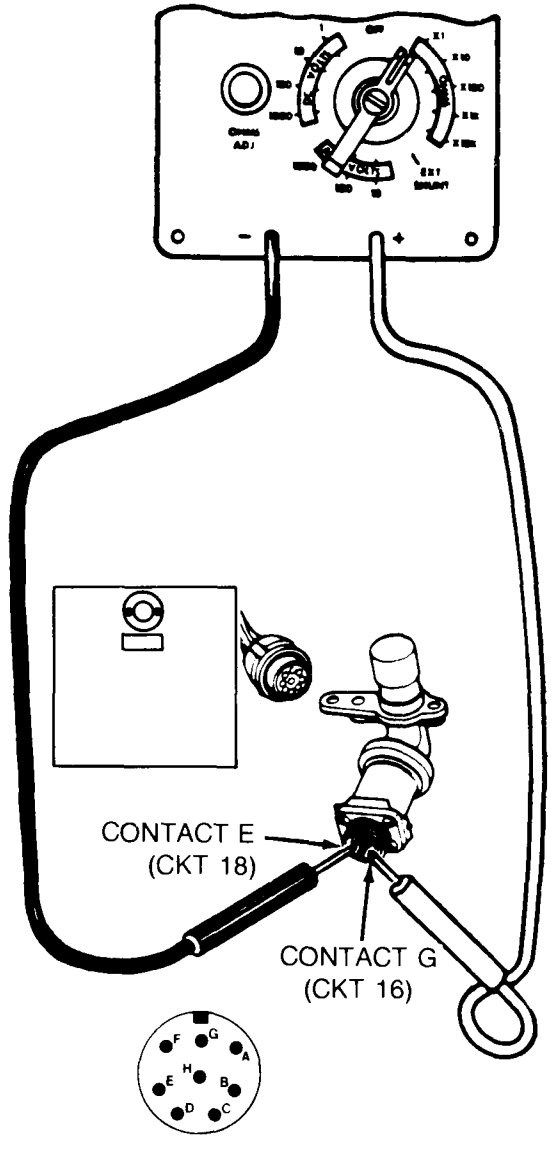
Symptom-67

5 **Check foot DIMMER SWITCH for continuity from contact E to contact G in both switch positions.**

Second Technician (Operator's Station)

- Connect red probe of meter to contact G (CKT 16) of foot DIMMER SWITCH.
- Connect black probe of meter to contact E (CKT 18) of foot DIMMER SWITCH.
- Check if meter indicates continuity.
- Press and release foot DIMMER SWITCH.
- Check if meter indicates continuity.

Does meter indicate continuity in one switch position only?



YES

NO

6 **Replace foot DIMMER SWITCH (page 10-169).**

TA250543

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

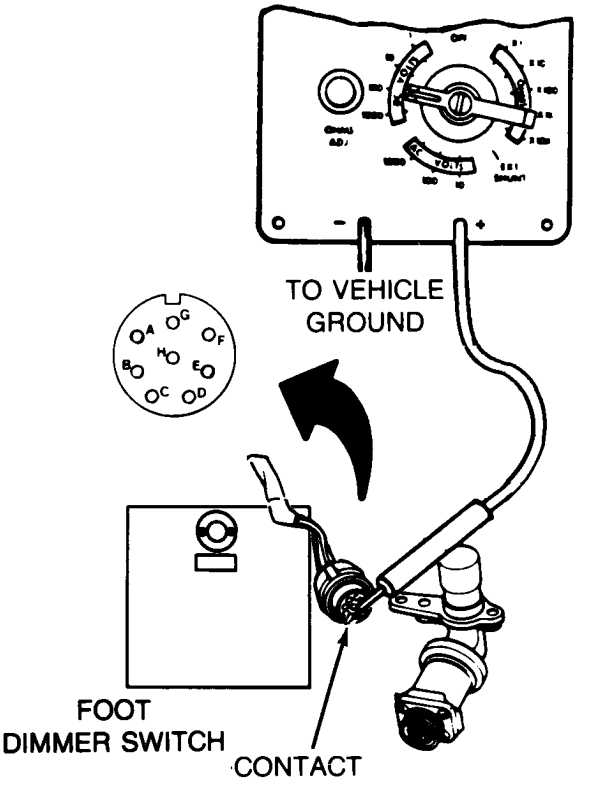
Symptom-67

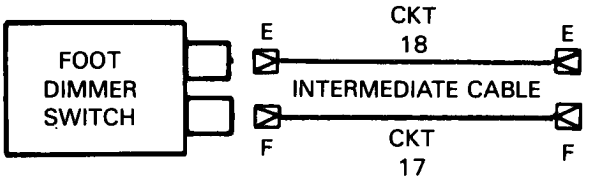
7 **Check continuity of CKT 17 and CKT 18 in intermediate cable.**

Second Technician (Operator's Station)

- Connect red probe of meter to contact F (CKT 17) of foot DIMMER SWITCH cable connector.
- Connect black probe of meter to contact F (CKT 17) of intermediate cable connector.
- Check if meter indicates continuity.
- Connect red probe of meter to contact E (CKT 18) of foot DIMMER SWITCH cable connector.
- Connect black probe of meter to contact E (CKT 18) of intermediate cable connector.
- Check if meter indicates continuity.

Does meter indicate continuity?





YES

8
- **Inspect front accessory harness (CKT 17 for high beam or CKT 18 for low beam) for bent/broken connector contacts or loose CKT 17/18 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Install foot DIMMER SWITCH (page 10-170).**

NO

9 **Repair intermediate cable (page 10-298).**

TA250544

Symptom-67

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

FROM STEP 2

10 Check basket-light switch harness connector (CKT 16) at basket disconnect for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Install foot DIMMER SWITCH.

First Technician (Commander's Station)

- Displace basket-light switch harness connector (CKT 16) at basket disconnect (page 10-269).
- Connect red probe of meter to contact M (CKT 16) of basket-light switch harness connector and black probe to ground.

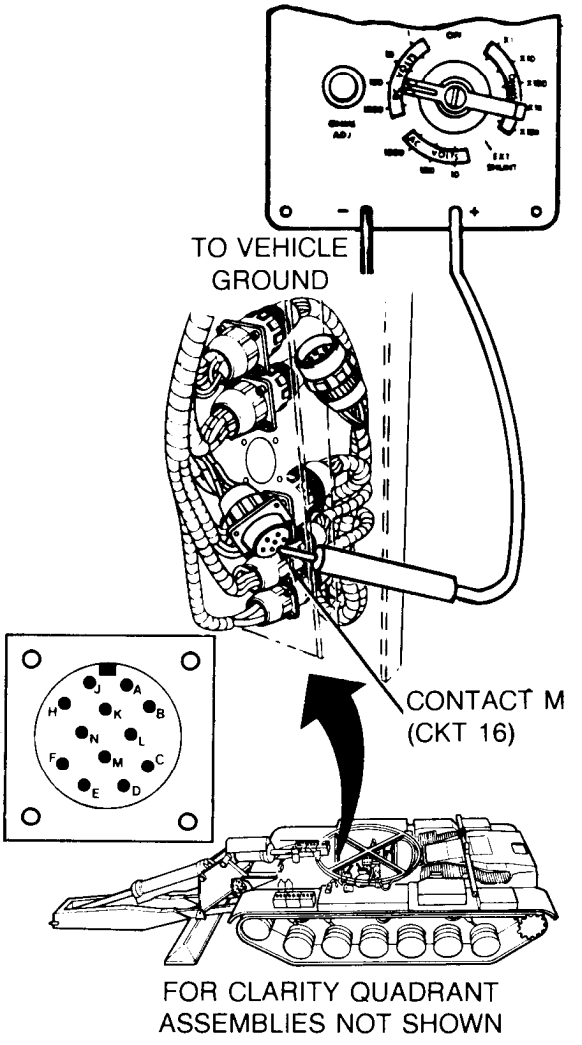
Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



NO

- **See step 14.**

YES

Check CKT 16 at intermediate cable.

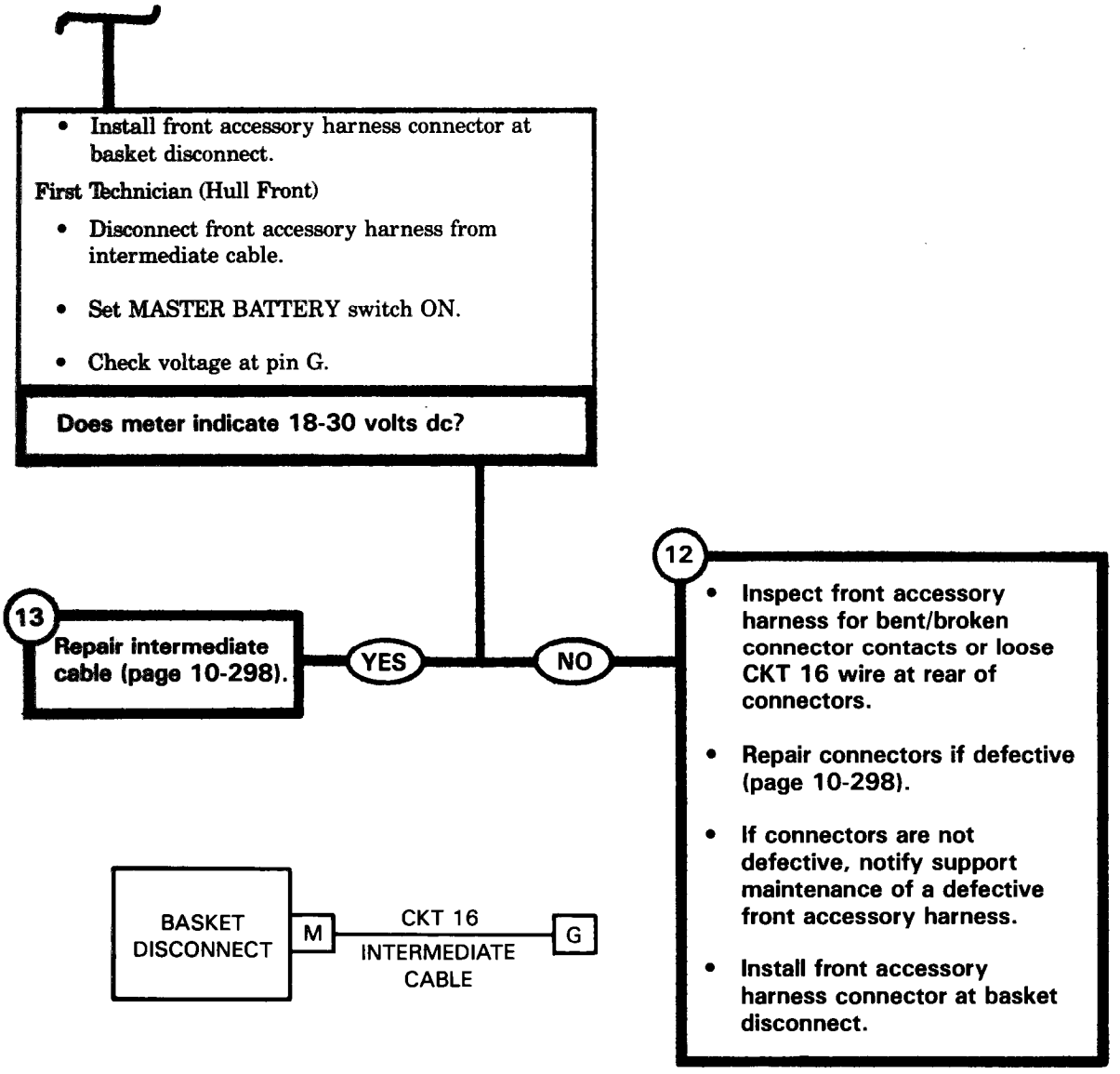
- **Set master battery switch OFF.**

TA250545

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

Symptom-67

STEP (11) CONTINUED



TA250546

Symptom-67

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

FROM STEP (10)

(14) Check basket-light switch harness (CKT 16) from connector at basket disconnect to connector at LIGHTING CONTROL switch for continuity.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-light switch harness connector from LIGHTING CONTROL switch.

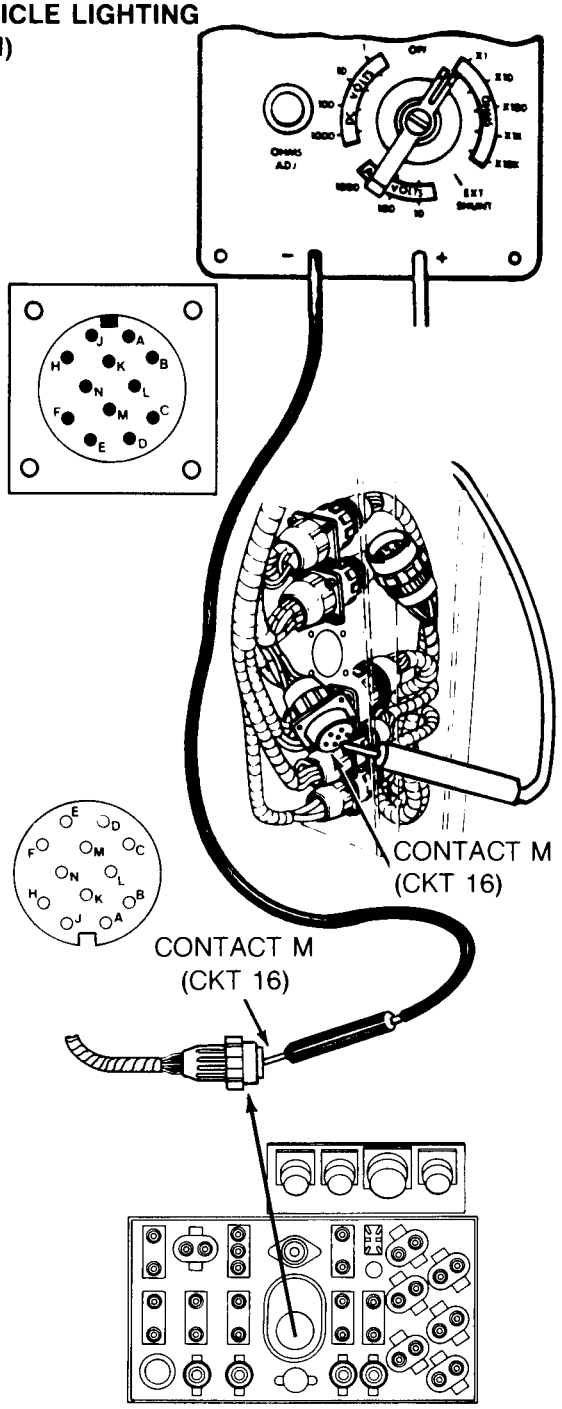
First Technician (Commander's Station)

Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).

- Connect red probe of meter to contact M (CKT 16) of basket-light switch harness connector at basket disconnect.

Second Technician (Operator's Station)

- Connect black probe of meter to contact M (CKT 16) of basket-light switch harness connector at LIGHTING CONTROL switch.



TA250547

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

Symptom-67

STEP (12) CONTINUED

First Technician (Commander's Station).

- Check if meter indicates continuity.

Does meter indicate continuity?

NO

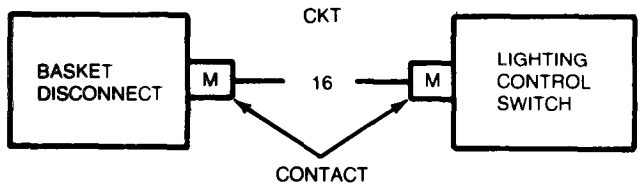
15

- **Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 16 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-light switch harness.**
- **Connect basket-light switch harness connector to LIGHTING CONTROL switch.**
- **Install master control panel (page 10-33).**
- **Install basket-light switch harness connector at basket disconnect.**

YES

16

- **Replace LIGHTING CONTROL switch (page 10-54).**
- **Connect basket-light switch harness connector at LIGHTING CONTROL switch.**
- **Install master control panel (page 10-33).**
- **Install basket-light switch harness connector at basket disconnect.**



TA250548

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING

Symptom-68

BOTH HIGH BEAM OR BOTH LOW BEAM IR LAMPS WILL NOT LIGHT.

WARNING

Do not look into IR lamps to see if they are on—severe eye damage may result.

NOTE

To check if IR lamps are working, place hand over the lens. The lens will be warm when IR lamp is on.

1 Check foot DIMMER SWITCH for continuity from contact A to contact C in both switch positions.

Technician (Operator's Station)

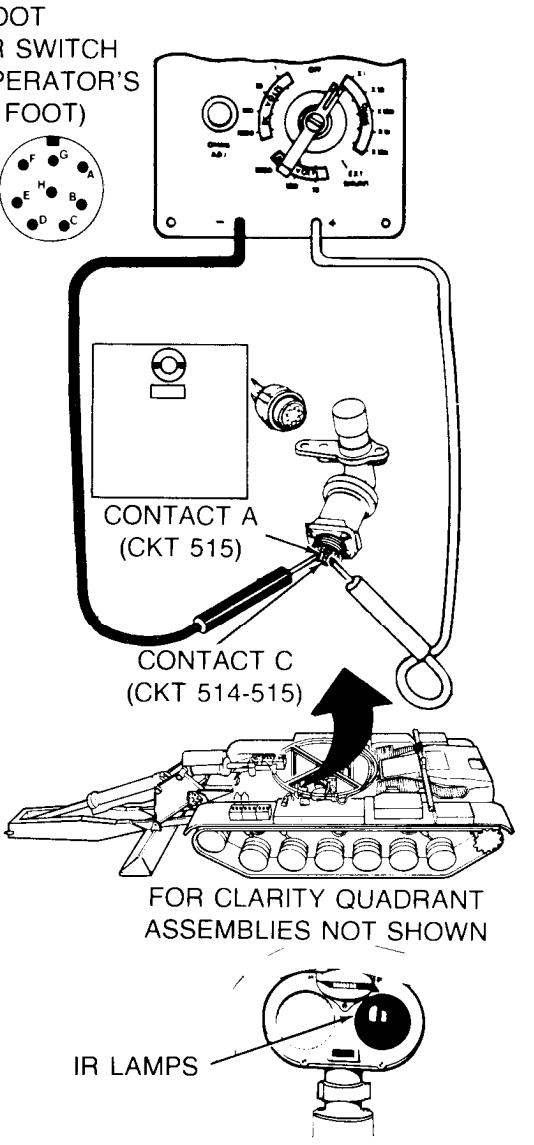
- Set MASTER BATTERY switch OFF.
- Remove foot DIMMER SWITCH (page 10-169).
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact C (CKT 514-515) and black probe to contact A (CKT 515) of foot DIMMER SWITCH.
- Check if meter indicates continuity.
- Press and release foot DIMMER SWITCH.
- Check if meter indicates continuity.

Does meter indicate continuity in one switch position only?

YES

NO

2 Replace foot DIMMER SWITCH (page 10-170).



TA250549

Symptom-68

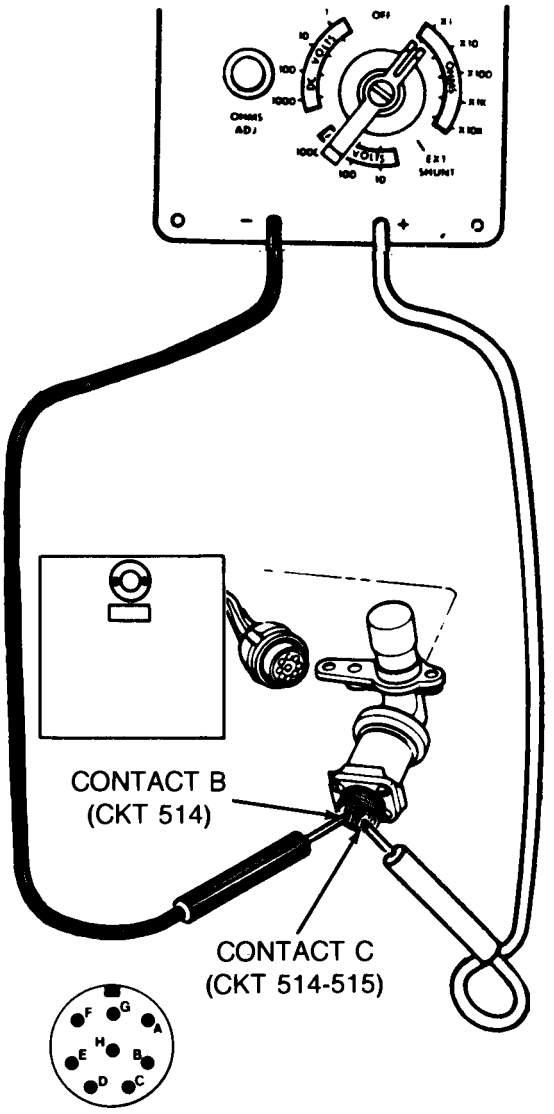
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

3 **Check foot DIMMER SWITCH for continuity from contact B to contact C in both switch positions.**

Technician (Operator's Station)

- Connect red probe of meter to contact C (CKT 514-515) of foot DIMMER SWITCH.
- Connect black probe of meter to contact B (CKT 514) of foot DIMMER SWITCH.
- Check if meter indicates continuity.
- Press and release foot DIMMER SWITCH.
- Check if meter indicates continuity.

Does meter indicate continuity in one switch position only?



YES

NO

4 **Replace foot DIMMER SWITCH (page 10-169).**

TA250550

Symptom-68

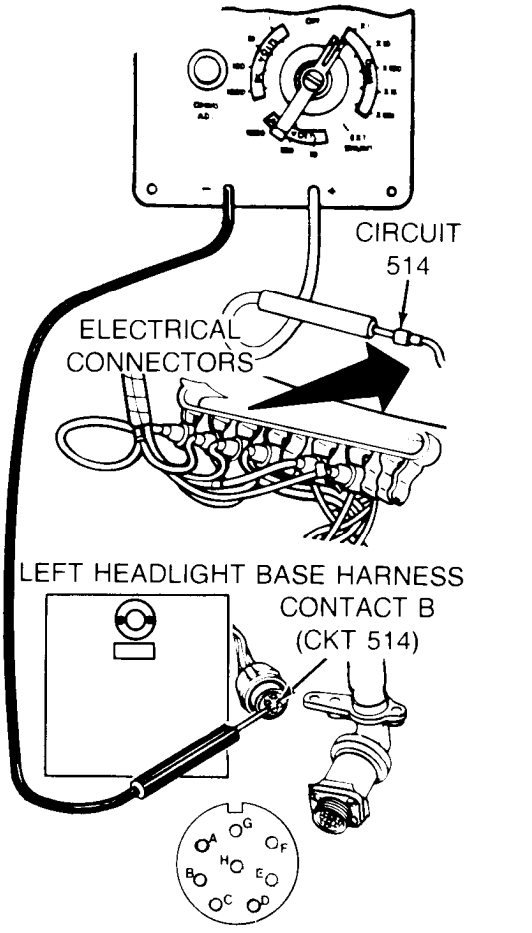
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

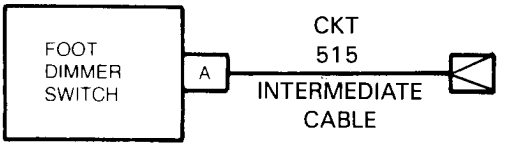
5 **Check foot dimmer intermediate harness (CKT 514) for continuity from intermediate connector to contact B of connector to contact B of foot DIMMER SWITCH.**

Technician (Operator's Station)

- Connect red probe of meter to intermediate harness connector contract B (CKT 514).
- Connect black probe of meter to contact B (CKT 514) of front accessory harness connector at foot DIMMER SWITCH.
- Check if meter indicates continuity.

Does meter indicate continuity?





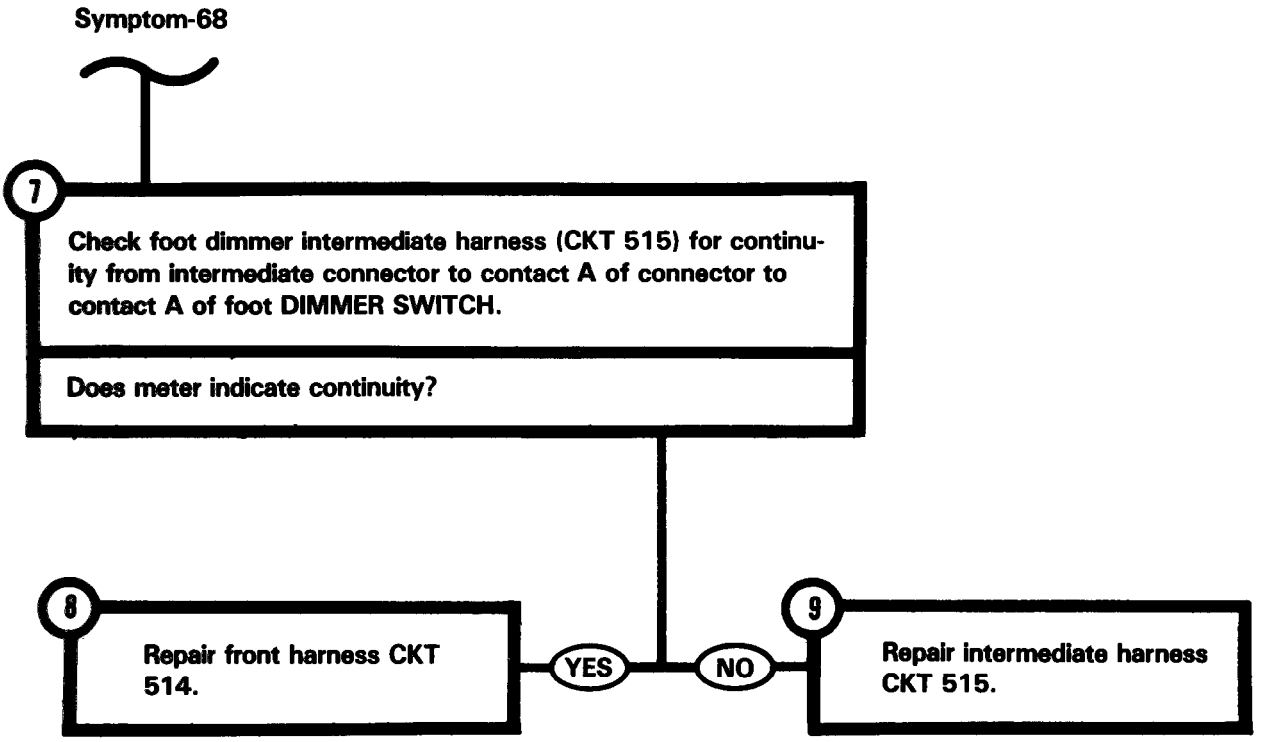
YES

NO

6 **Repair foot dimmer intermediate harness CKT514.**

TA250551

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM-VEHICLE LIGHTING
(Continued)



TA250552

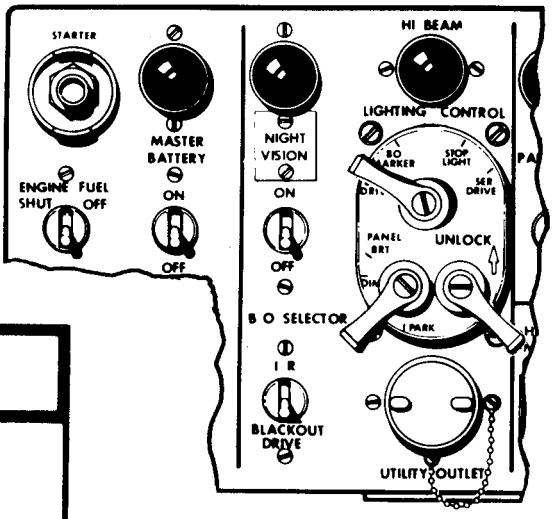
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING

Symptom-69

IR LAMPS WILL NOT LIGHT (HIGH OR LOW)

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



MASTER CONTROL PANEL

1 **Check if B.O. drive lamp will light.**

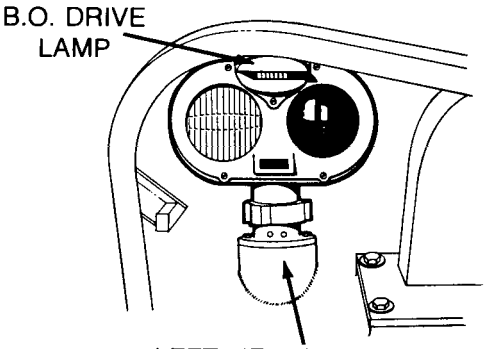
First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Turn LIGHTING CONTROL switch to B.O. DRIVE.
- Set BO SELECTOR switch to BLACKOUT DRIVE.

Second Technician (Front of Vehicle)

- Visually check if B.O. drive lamp is lit.

Does B.O. drive lamp light?



LEFT HEADLIGHT ASSEMBLY

YES

NO

2

- **Check if gage instrument panel lamps will light.**
- **See Step (10) .**

TA250553

Symptom-69

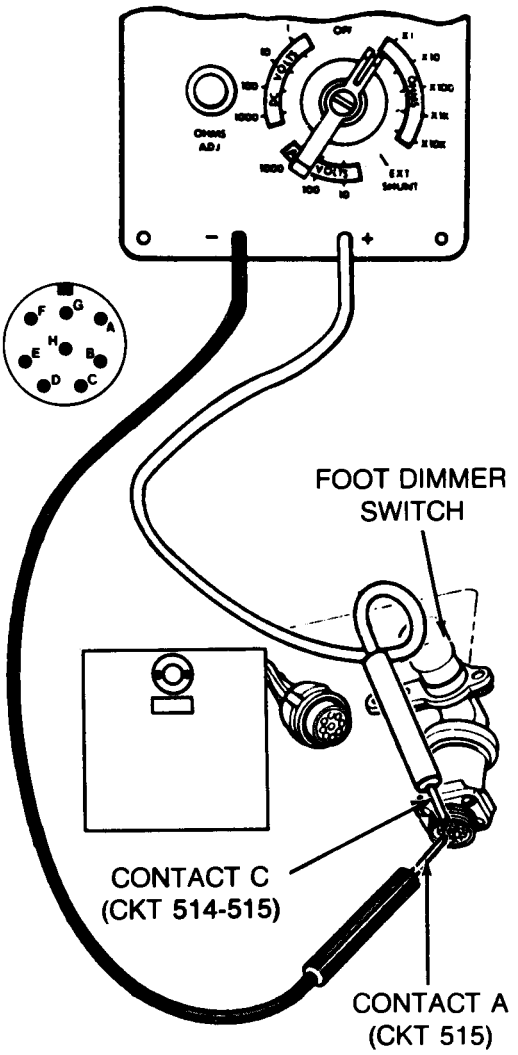
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

3 **Check foot DIMMER SWITCH Connector CKT (514-515) for electrical power.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Remove foot DIMMER SWITCH (page 10-169).
- Set multimeter to measure 18 to 30 Vdc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact C (CKT514-515) and black probe to ground.
- Set master battery switch ON.
- Check if meter indicates 18-30 Vdc.

Does meter indicate 18-30 Vdc?



YES

NO

4 **Replace foot DIMMER SWITCH (page 10-169).**

TA250554

Symptom-69

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

5 **Check master control panel accessories harness (CKT 514-515) at panel connector for electrical power.**

First Technician (Operator's Station)

- Install foot DIMMER SWITCH (page 10-170).
- Set B.O. SELECTOR switch to IR.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness connector from master control panel.
- Connect three battery ground straps (page 10-268).
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact C (CKT 514-515) of master control panel accessories harness connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

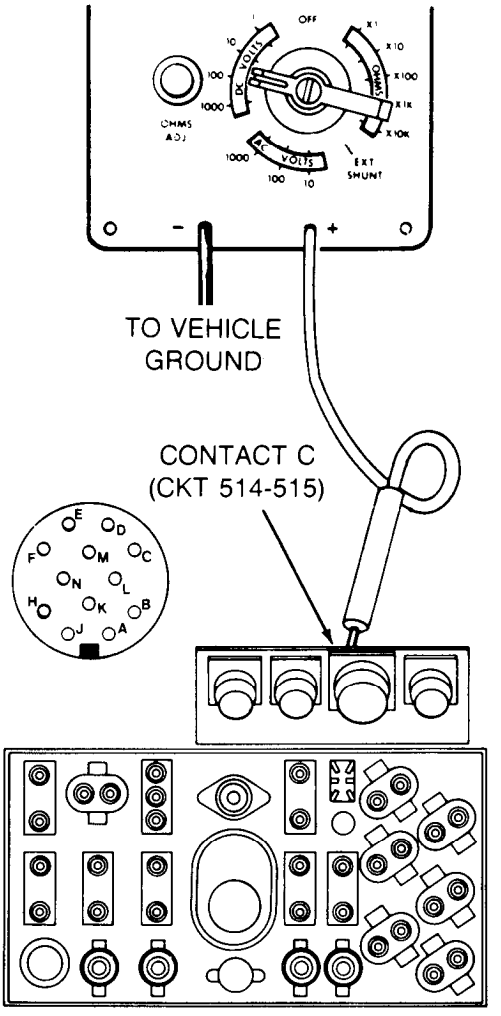
Does meter indicate 18 to 30 volts dc?

6 **Check basket-control panel accessories harness (CKT 514-515) at basket disconnect for electrical power.**

YES

See Step (26) .

NO



TA250555

Symptom-69

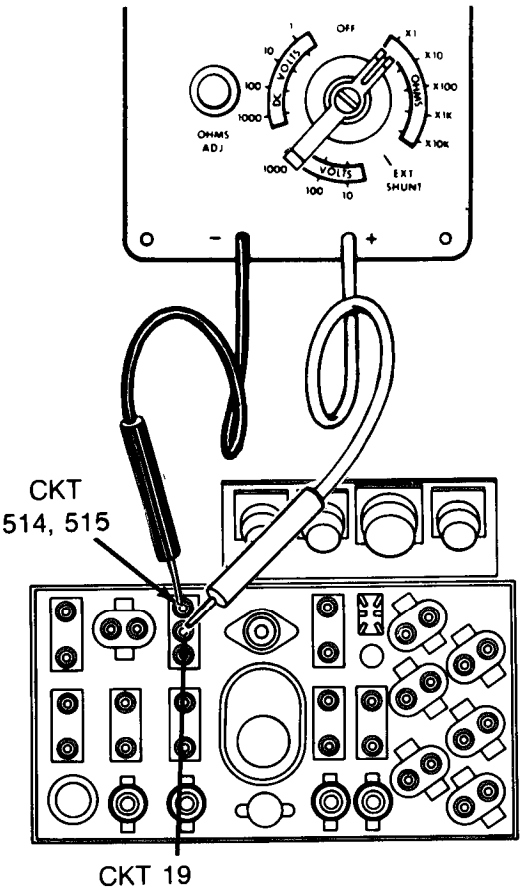
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

7 **Check B.O. SELECTOR switch for continuity (switch in IR positon).**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect master control panel accessories harness connectors (CKT 514-515 and CKT 19) from B.O. SELECTOR switch.
- Set multimeter to OHMS X1 scale, and "zero" meter or use STE/ICE Test No. 91 **(page 4-83).**
- Connect red probe of meter to center contact and black probe to top contact of B.O. SELECTOR switch.
- Check if meter indicates continuity.

Does meter indicate continuity?



NO

8
- **Replace B.O. SELECTOR switch (page 10-58).**
- **Connect basket-control panel accessories harness to master control panel.**

YES

9 **Replace master control panel accessories harness (page 10-91).**

TA250556

Symptom-69

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

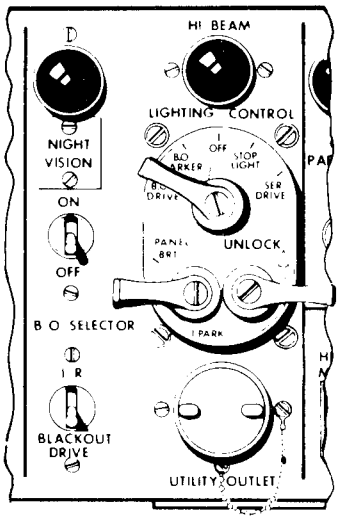
FROM STEP (2)

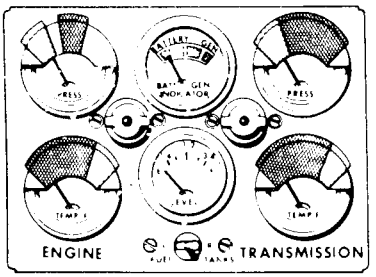
10 **Check if gage instrument panel lamps will light.**

First Technician (Operator's Station)

- Set LIGHTING CONTROL PANEL switch to DIM.
- Visually check if gage indicator panel lamps are lit.

Do gage instrument panel lamps light?





GAGE INSTRUMENT PANEL

YES

NO

11 **Replace LIGHTING CONTROL switch (page 10-54).**

TA250557

Symptom-69

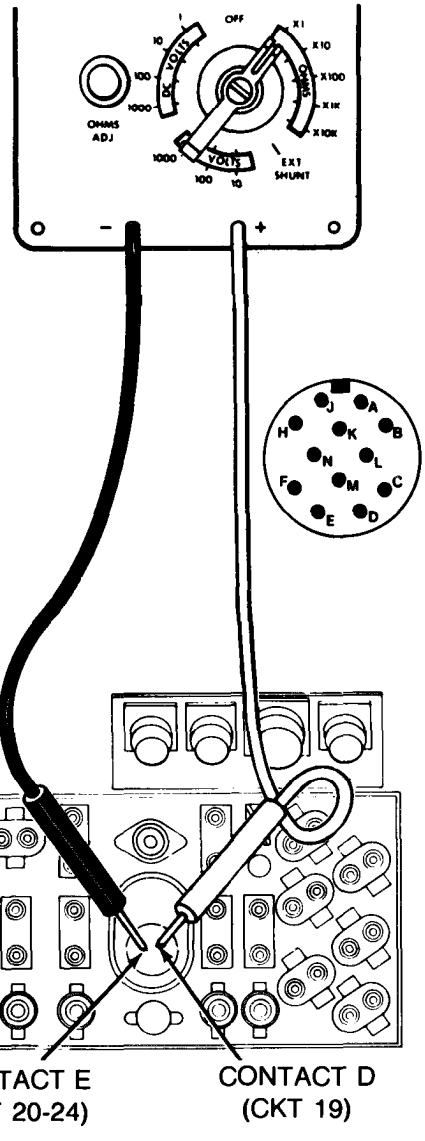
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

12 **Check LIGHTING CONTROL switch for continuity between contacts D and E.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-light switch harness connector from LIGHTING CONTROL switch connector on master control panel.
- Set multimeter to OHMS X1 scale and "zero" meter or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact D (CKT 19) and black probe to contact E (CKT 20-24) of LIGHTING CONTROL switch connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



MASTER CONTROL PANEL (REAR VIEW)

YES

NO

13 **Replace LIGHTING CONTROL switch (page 10-54).**

TA250558

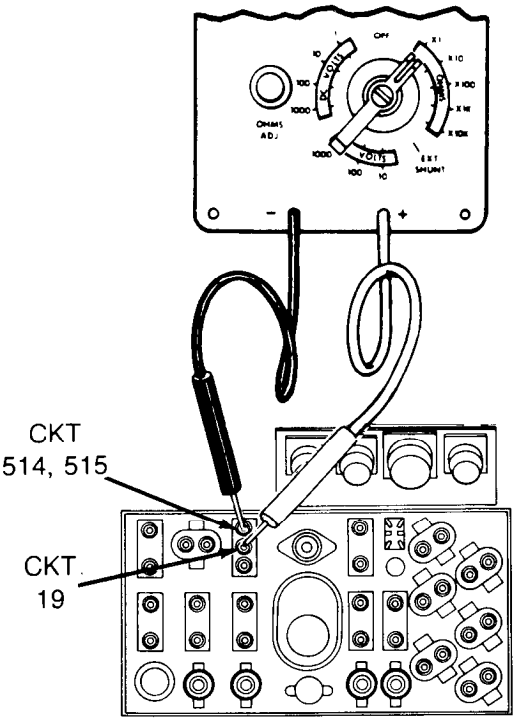
Symptom-69

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

14 **Check B.O. SELECTOR switch for continuity (switch in IR position).**

First Technician (Operator's Station)

- Set B.O. SELECTOR switch to IR.
- Disconnect master control panel accessories harness connector (CKT 514-515) from B.O. SELECTOR switch.
- Disconnect basket-light switch harness connector (CKT 19) from B.O. SELECTOR switch.
- Connect red probe of meter to center contact and black probe to top contact of B.O. SELECTOR switch.
- Check if meter indicates continuity.



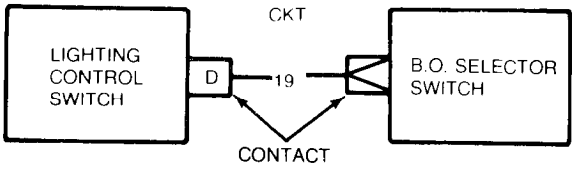
Does meter indicate continuity?

15
- **Replace B.O. SELECTOR switch (page 10-58).**
- **Connect basket-light switch harness connector to master control panel.**

NO

YES

16
- **Inspect basket-light switch harness for bent/broken connector contacts or loose CKT 19 wire at rear of connectors (CKT 19) from B.O. SELECTOR switch to LIGHTING CONTROL switch.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-light switch harness.**
- **Connect basket-light switch harness connector to LIGHTING CONTROL switch.**
- **Install master control panel (page 10-33).**



TA250559

Symptom-69

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

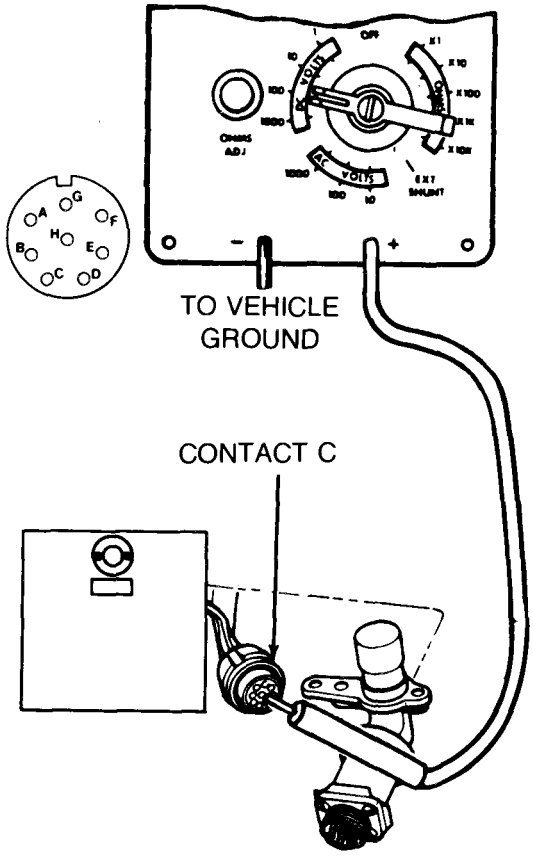
FROM STEP (4)

17 **Check front accessory harness (CKT 514-515) at connector to foot DIMMER SWITCH for electrical power.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set B.O. SELECTOR switch to IR.
- Set multimeter to measure 18 to 30 volts dc or use STE/ICE Test No. 89 **(page 4-81)**.
- Connect red probe of meter to contact C (CKT 514-515) of front accessory harness connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



NO

YES

18 **Replace foot DIMMER SWITCH (page 10-169).**

TA250560

Symptom-69

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

19 **Check basket-control panel accessories harness connector (CKT 514-515) at basket disconnect for electrical power.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

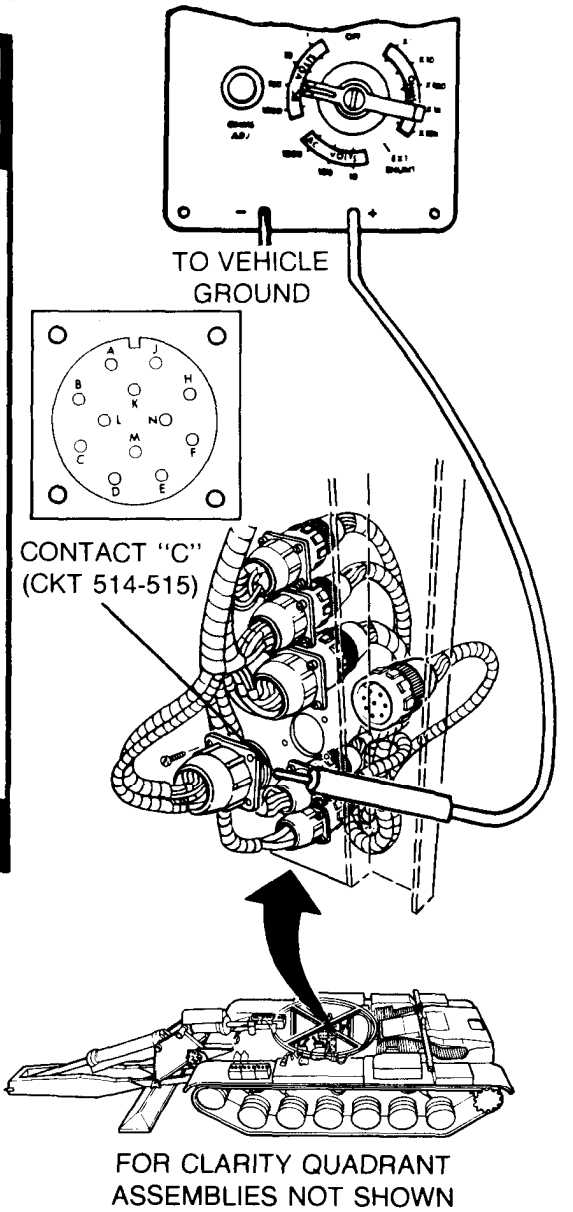
Second Technician (Commander's Station)

- Displace basket-control panel accessories harness connector from basket disconnect.
- Connect red probe of meter to contact "C" (CKT 514-515) of basket-control panel accessories harness connector and black probe to ground.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



NO

YES — See step 23.

TA250561

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

Symptom-69

20 **Check CKT 514-515 of intermediate cable for continuity.**

First Technician (Operators Station)
- Set MASTER BATTERY switch OFF.
- Set multimeter to OHM X1 scale and "ZERO" meter or use STE/ICE Test No. 91 (page 4-83).
- Disconnect intermediate cable connector (CKT514-515) from basket control panel accessories harness on master control panel.
- Connect red probe of meter to contact C (CKT 514-515) on basket- control panel accessories harness at control panel.

Second Technician (Commanders Station)
- Connect black probe of meter to contact C (CKT 514-515) of intermediate cable connector at basket disconnect.
- Check if meter indicates continuity

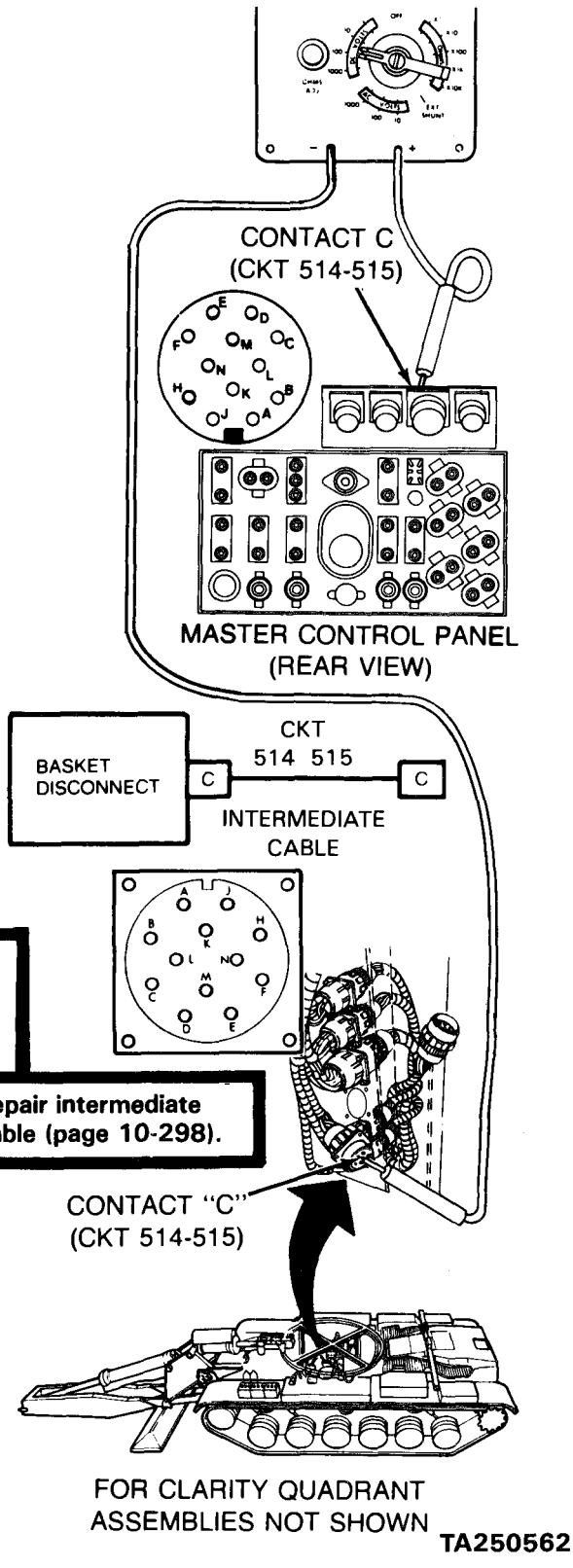
Does meter indicate continuity?

YES

21
- **Inspect front accessories harness for bent/broken connector contacts or loose CKT 514-515 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Install basket-control panel accessories harness connector to basket disconnect.**

NO

22 **Repair intermediate cable (page 10-298).**



TA250562

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

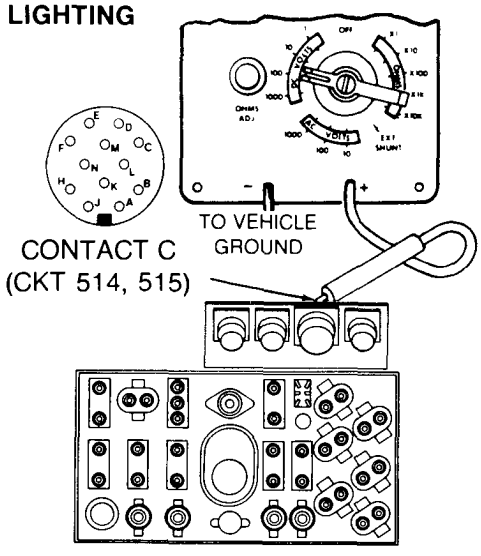
Symptom-69
FROM STEP 19

23 **Check master control panel accessories harness (CKT 514-515) panel connector for electrical power.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect front accessory harness connector from master control panel.
- Connect red probe of meter to contact C (CKT 514-515) of master control panel accessories harness panel connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc?

Does meter indicate 18 to 30 volts dc?



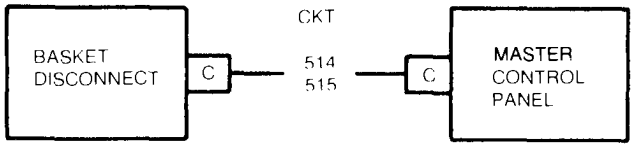
MASTER CONTROL PANEL
(REAR VIEW)

NO

24
- **Replace master control panel accessories harness (page 10-91).**
- **Install basket-control panel accessories harness at basket disconnect.**

YES

25
- **Inspect basket-control panel accessories harness for bent/broken connector contacts or loose CKT 514-515 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-control panel accessories harness.**
- **Connect basket-control panel accessories harness to master control panel.**
- **Install master control panel (page 10-33).**
- **Install basket-control panel accessories harness connector at basket-disconnect.**



TA250563

Symptom-69
FROM STEP 6

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

26 **Check basket-control panel accessories harness (CKT 514-515) at basket disconnect for electrical power.**

First Technician(Operator's Station)

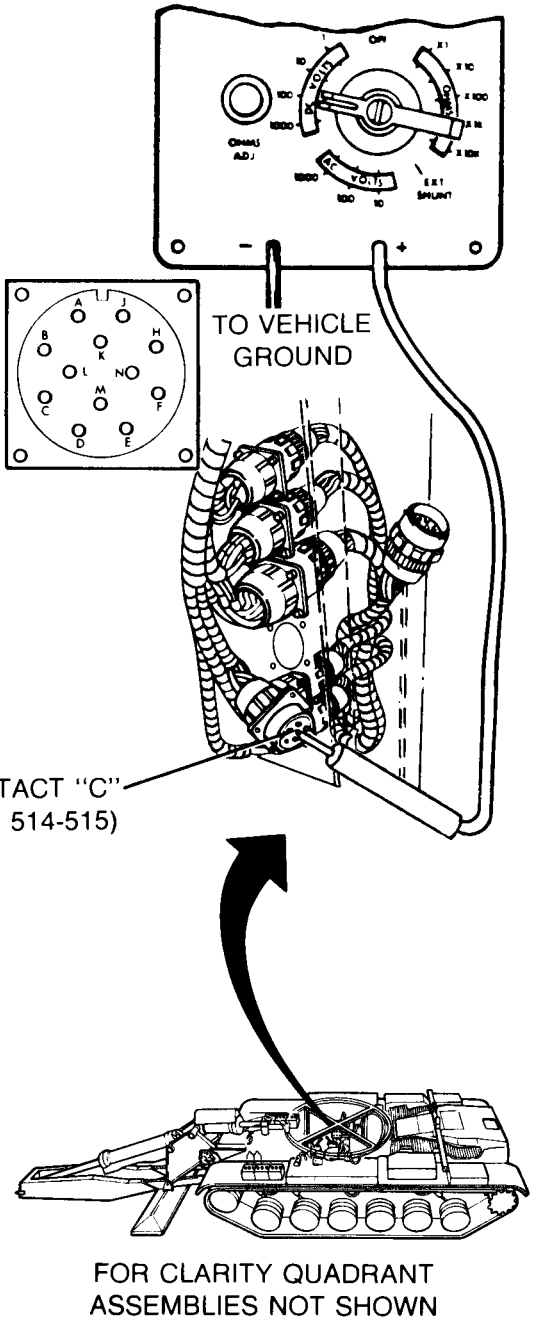
- Connect basket-control panel accessories harness connector to master control panel.

Second Technician (Commander's Station)

- Displace basket-control panel accessories harness connector from basket disconnect (page 10-269).
- Connect red probe of meter to contact "C" (CKT 514-515) of basket-control panel accessories harness connector and black probe to ground.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.



TA250564

Symptom-69

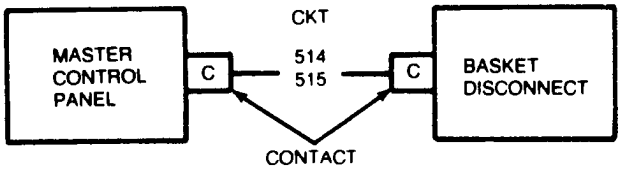
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

STEP (26) CONTINUED

Second Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



YES

NO

(27)

- **Inspect basket-control panel accessories harness for bent/ broken connector contacts or loose CKT 514-515 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective notify support maintenance of a defective basket-control panel accessories harness.**
- **Install basket-control panel accessories harness connector at basket disconnect.**
- **Install master control panel (page 10-33).**

TA250565

Symptom-69

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - VEHICLE LIGHTING
(Continued)

28

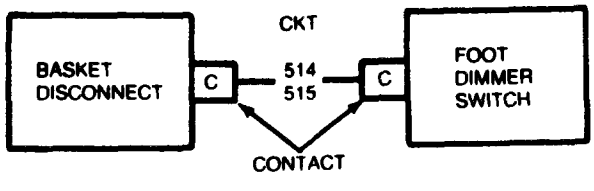
Check front accessories harness at foot dimmer intermediate disconnect.

- Connect harness at basket disconnect.
- Disconnect intermediate connector.
- Set MASTER BATTERY switch ON.

Does meter indicate 18 to 30 volts dc?

YES → Replace foot dimmer intermediate harness

NO → Replace-repair front accessories harness



TA250566

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERISCOPES

Symptom-70

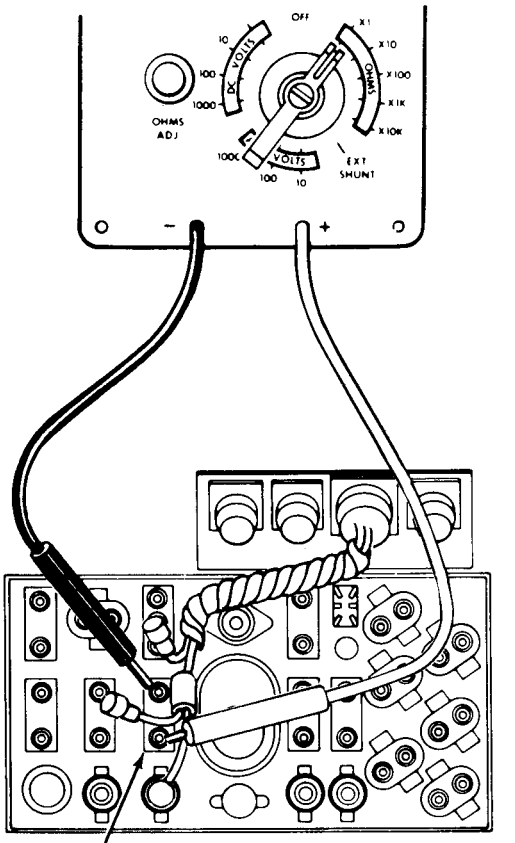
IR PERISCOPES WILL NOT WORK
(NIGHT VISION INDICATOR LAMP WILL NOT LIGHT)

1 **Check NIGHT VISION switch in master control panel for continuity.**

Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set NIGHT VISION switch OFF.
- Displace master control panel (page 10-33).
- Disconnect master control panel accessories harness leads (CKT 516) from NIGHT VISION switch.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Set NIGHT VISION switch ON.
- Connect red probe of meter to one contact of NIGHT VISION switch.
- Connect black probe of meter to the other contact of NIGHT VISION switch.
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

NO

2 **Replace NIGHT VISION switch (page 10-50).**

TA250567

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERISCOPES
(Continued)

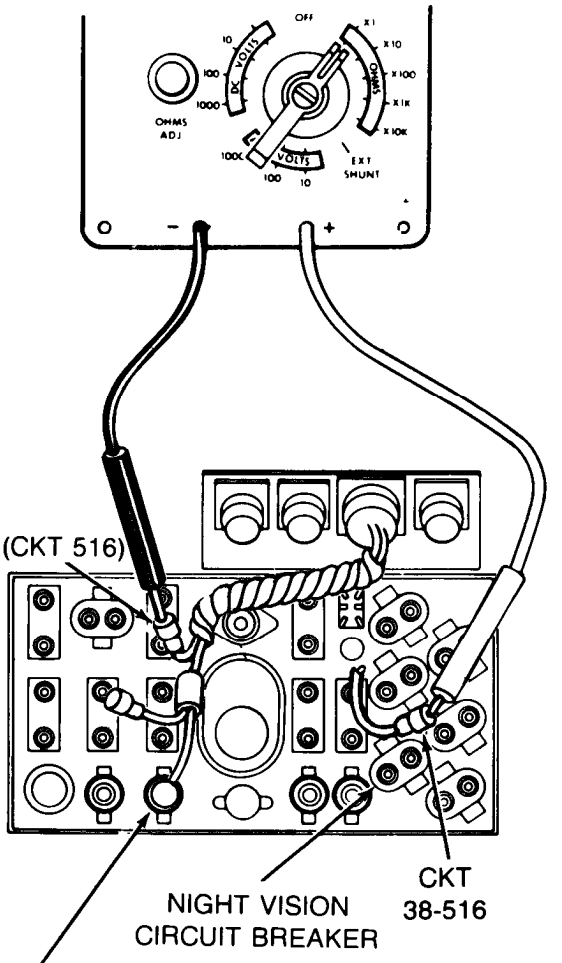
Symptom-70

3 **Check master control panel accessories harness for continuity between NIGHT VISION circuit breaker (CKT 38-516) and NIGHT VISION switch (CKT 516).**

Technician (Operator's Station)

- Disconnect master control panel accessories harness lead (CKT 38-516) from night vision circuit breaker.
- Connect black probe of meter to accessories harness lead (CKT 516) at NIGHT VISION switch connector which does not feed to the NIGHT VISION indicator lamp.
- Connect red probe of meter to accessories harness lead (CKT 38-516) at circuit breaker.
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

NO

4 **Replace master control panel accessories harness (page 10-91).**

TA250568

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERISCOPES
(Continued)

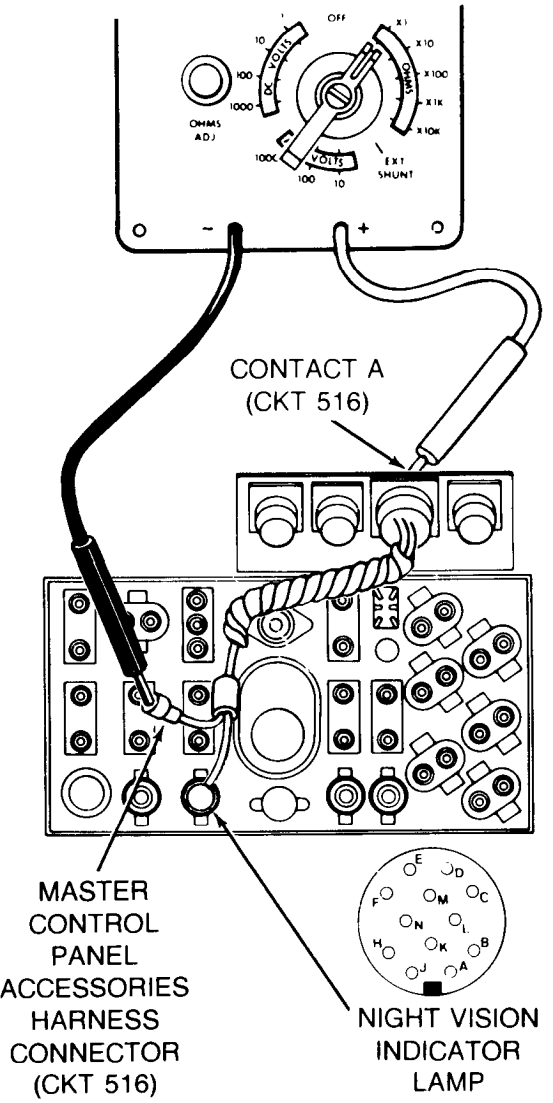
Symptom-70

5 **Check master control panel accessories harness (CKT 516) for continuity between panel connector and NIGHT VISION switch.**

Technician (Operator's Station)

- Disconnect basket-control panel accessories harness connector at master control panel.
- Connect red probe of meter to contact A (CKT 516) of master control panel accessories harness connector.
- Connect black probe of meter to master control panel accessories harness connector (CKT 516) at NIGHT VISION switch which feeds to the NIGHT VISION indicator lamp.
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

NO

6 **Replace master control panel accessories harness (page 10-91).**

TA250569

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERISCOPES
(Continued)

Symptom-70

7 **Check night vision circuit breaker for continuity.**

Technician (Operator's Station)

- Connect master control panel accessories harness leads (CKT 516) to NIGHT VISION switch.
- Disconnect master control panel wiring harness lead (CKT 38-516A) from night vision circuit breaker.
- Connect red probe of meter to one contact of circuit breaker.
- Connect black probe of meter to other contact of circuit breaker.
- Check if meter indicates continuity.

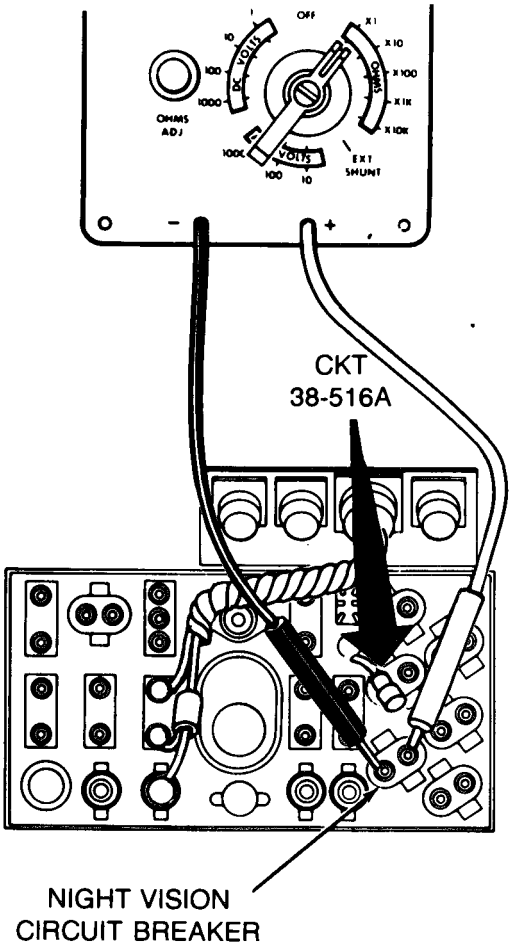
Does meter indicate continuity?

NO

8
- **Replace night vision circuit breaker (page 10-70).**
- **Connect basket-control panel accessories harness connector to master control panel.**

YES

9
- **Replace master control panel power wiring harness (page 10-101).**
- **Connect basket-control panel accessories harness connector to master control panel.**
- **Connect master control panel accessories harness lead (CKT 38-516) to night vision circuit breaker.**



TA250570

Symptom-71

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERISCOPES

BOTH IR PERISCOPES WILL NOT WORK (INDICATOR LAMP WILL LIGHT).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check master control panel accessories harness connector (CKT 516) for electrical power.

Second Technician (Operator's Station)

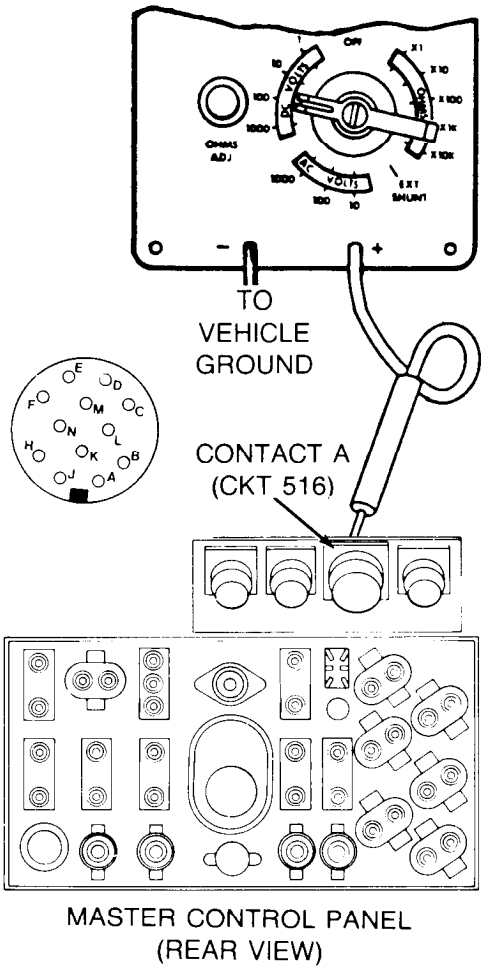
- Set NIGHT VISION switch OFF.
- Set MASTER BATTERY switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness connector (CKT 516) from master control panel.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact A (CKT 516) of master control panel connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Set NIGHT VISION switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

YES

NO

2 Replace master control panel accessories harness (page 10-91).



TA250571

Symptom-71 **DETAILED TROUBLESHOOTING PROCEDURE**
SUPPORT SYSTEM - PERISCOPES
(Continued)

3 Check basket-control panel accessories harness (CKT 516) for electrical power.

Second Technician (Operator's Station)

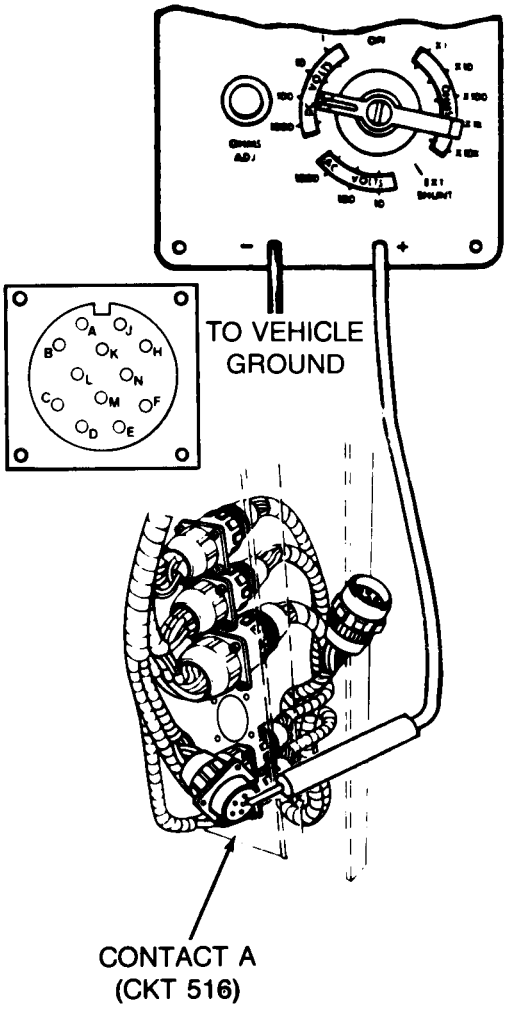
- Set NIGHT VISION switch OFF.
- Set MASTER BATTERY switch OFF.
- Connect basket-control panel accessories harness connector (CKT 516) to master control panel.

First Technician (Commander's Station)

- Displace basket-control panel accessories harness (CKT 516) at basket disconnect.
- Connect red probe of meter to contact A (CKT 516) of basket-control panel accessories harness connector and black probe to ground.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set NIGHT VISION switch ON.



TA250572

Symptom-71

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERISCOPES
(Continued)

STEP (3) CONTINUED

First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

YES

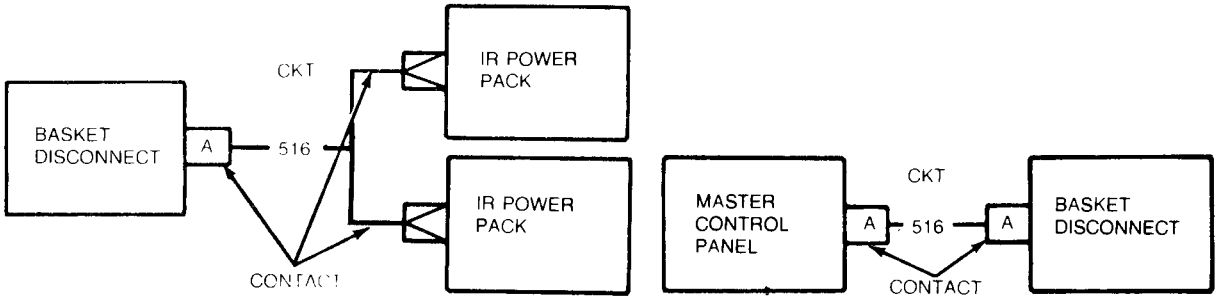
4

- **Inspect front accessory harness for bent/broken connector contacts or loose CKT 516 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessory harness.**
- **Install basket-control panel accessories harness connector at basket disconnect (page 10-270).**
- **Install master control panel (page 10-33).**

NO

5

- **Inspect basket-control panel accessories harness for bent/broken connector contacts or loose CKT 516 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-control panel accessories harness.**
- **Install basket-control panel accessories harness connector at basket disconnect (page 10-270).**
- **Install master control panel (page 10-33).**



TA250573

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERISCOPES

Symptom-72

OPERATOR'S IR PERISCOPE WILL NOT WORK .

WARNING

The IR powerpack is a high voltage item. Injury to personnel or damage to M24 IR periscope could occur if MASTER BATTERY and NIGHT VISION switches are ON when IR periscope power cable is being connected to, or disconnected from, IR periscope. Be sure to set MASTER BATTERY and NIGHT VISION switches OFF before connecting or disconnecting cable.

CAUTION

Perform M24 IR periscope night vision viewer checks during darkness only. Do not expose IR periscope to direct sunlight.

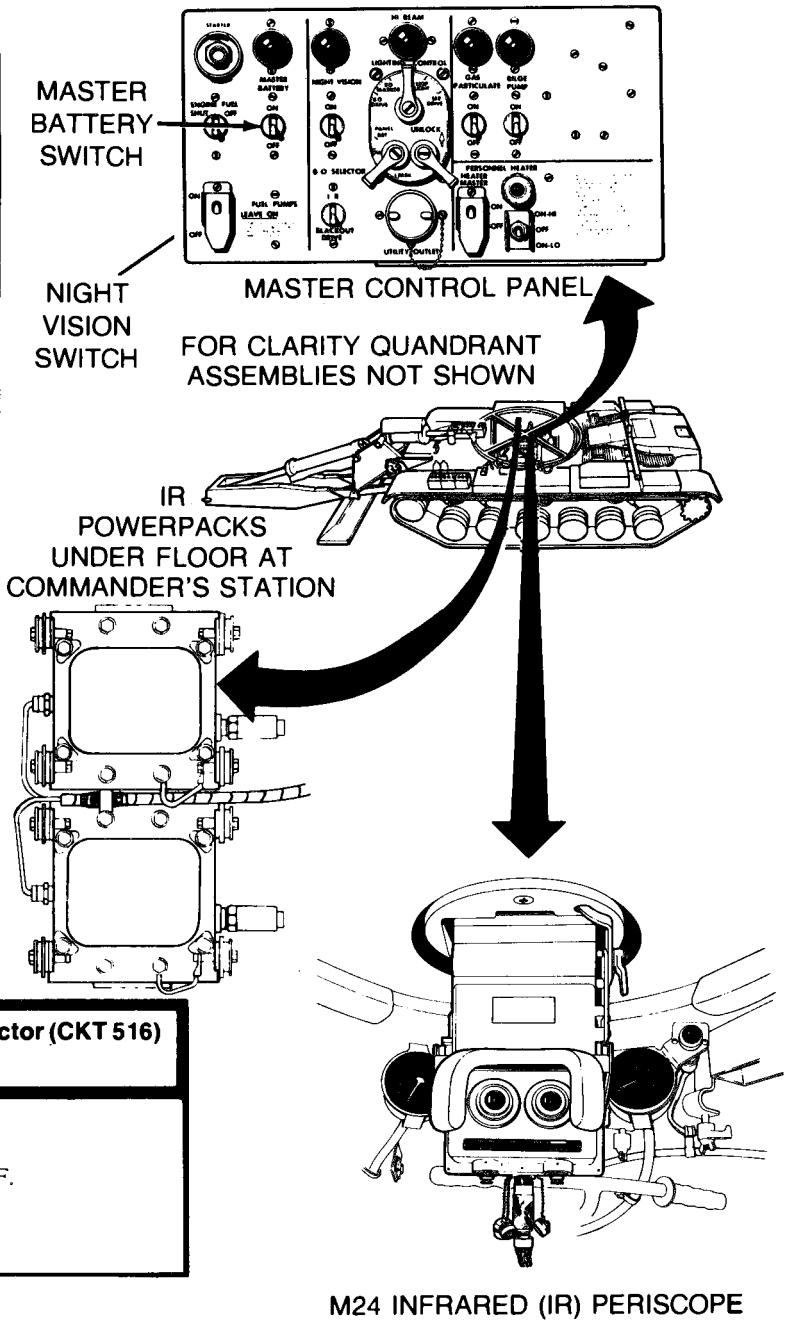
NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

1 Check front accessories harness connector (CKT 516) at IR powerpack for electrical power.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set NIGHT VISION switch OFF.



TA250574

Symptom-72

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERISCOPES
(Continued)

STEP 1 CONTINUED

First Technician (Commander's Station)

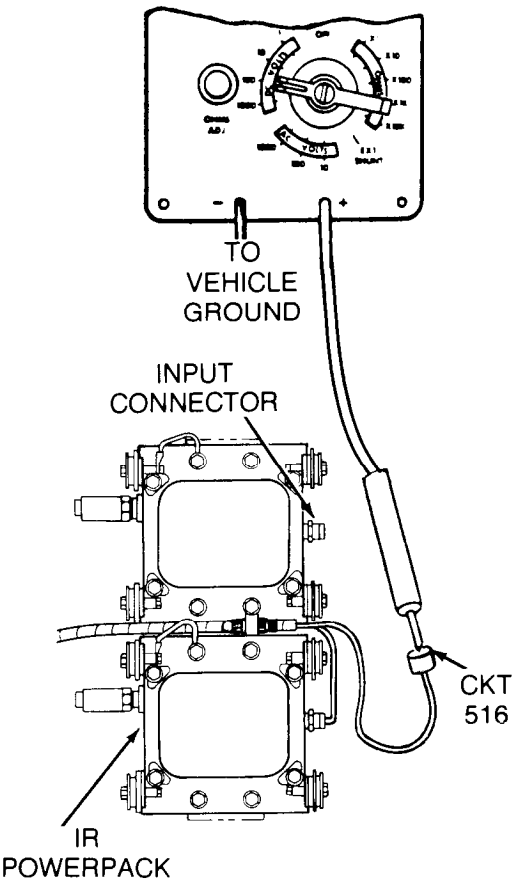
- Remove floor access cover (at Commander's feet) (page 17-7).
- Disconnect front accessories harness connector (CKT 516) from IR powerpack input connector of defective IR periscope.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to front accessories harness connector (CKT 516) and black probe to ground.

Second Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set NIGHT VISION switch ON.

First Technician (Commander's Station)

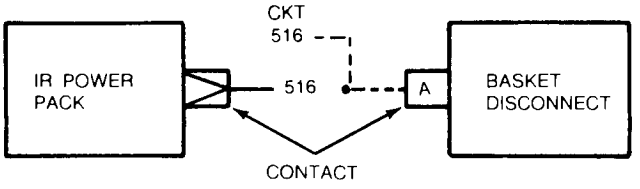
- Check if meter indicates 18 to 30 volts dc.



Does meter indicate 18 to 30 volts dc?

YES

NO



2

- **Inspect front accessories harness for bent/broken connector contacts or loose CKT 516 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective front accessories harness.**
- **Reconnect front accessories harness connector to IR powerpack.**
- **Install floor access cover (page 17-7).**

TA250575

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERISCOPES
(Continued)

Symptom-72

WARNING

Wait two minutes after night vision switch is turned off before disconnecting IR periscope power cable. (High voltage is present at power cable for a few minutes after night vision switch is set OFF.

3 Check IR periscope power cable (CKT 517) for continuity.

Second Technician (Operator's Station)

- Set NIGHT VISION switch OFF.
- Set MASTER BATTERY switch OFF.
- Disconnect IR periscope power cable connector (CKT 517) from IR periscope.

First Technician (Commander's Station)

- Reconnect front accessories harness connector (CKT 516) to IR powerpack input connector.
- Disconnect IR periscope power cable connector (CKT 517) from IR powerpack output connector.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact at powerpack end of IR power cable.

Second Technician (Operator's Station)

- Connect black probe to periscope end of IR power cable.

First Technician (Commander's Station)

- Check if meter indicates continuity.

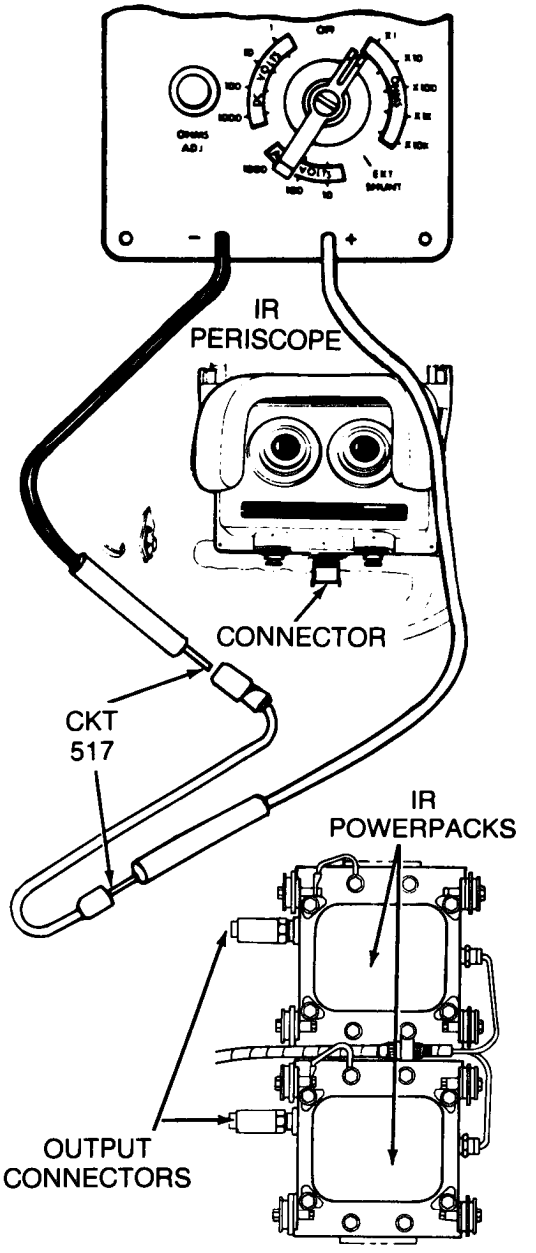
Does meter indicate continuity?

YES

NO

4

- **Notify support maintenance of bad IR periscope power cable.**
- **Connect IR periscope power cable to IR powerpack and IR periscope.**



TA250576

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERISCOPES
(Continued)

Symptom-72

5 **Check operation of IR periscope by substituting it with a serviceable unit.**

Second Technician (Operator's Station)

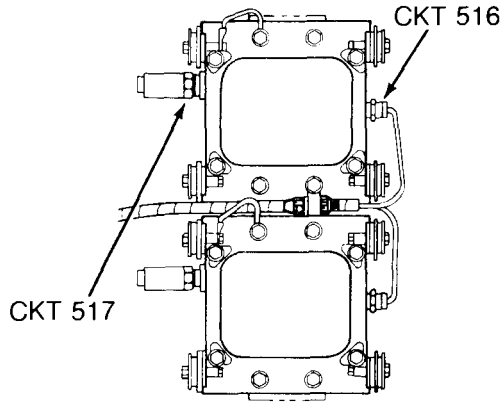
- Obtain and install serviceable IR periscope (TM 5-5420-202-10).

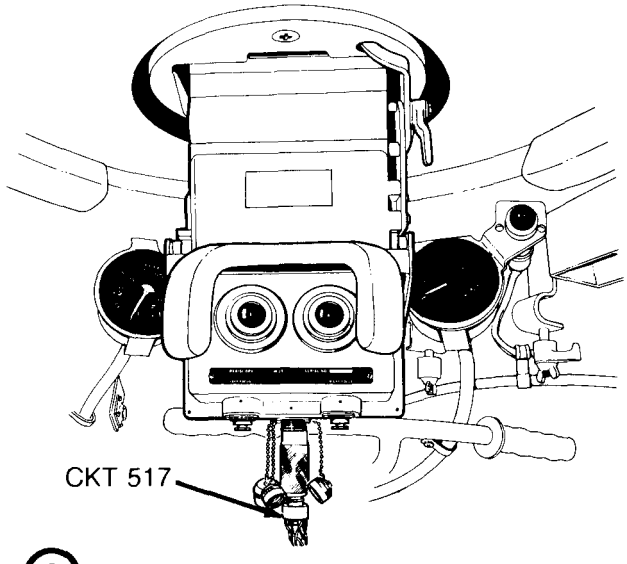
First Technician (Commander's Station)

- Connect IR periscope power cable (CKT 517) to IR powerpack.

Second Technician (Operator's Station)

- Connect IR periscope power cable (CKT 517) to IR periscope.
- Set MASTER BATTERY switch ON.
- Set NIGHT VISION switch ON.
- Operate IR periscope (TM 5-5420-202-10).
- Check for clear image while looking through periscope eyepiece.





Can clear image be seen through eyepiece?

NO

6 **Replace unserviceable IR powerpack (page 10-152).**

YES

7
- **Original IR periscope is unserviceable. Replace unserviceable IR periscope (page 10-152).**
- **Install floor access cover (page 17-7).**

TA250577

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER

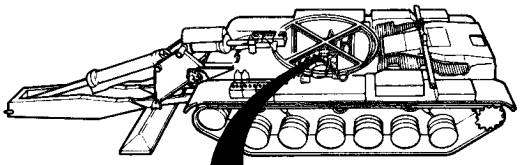
Symptom-73

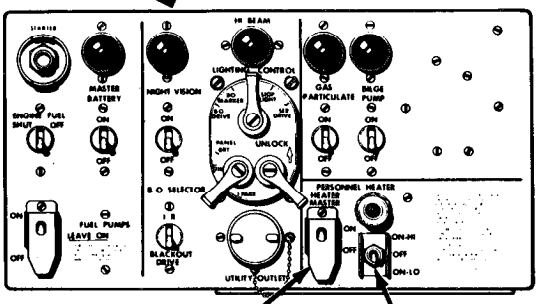
NO HEAT FROM PERSONNEL HEATER.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

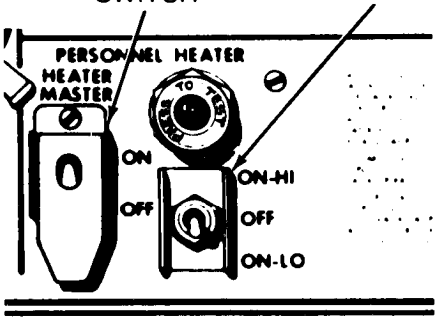
FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN





HEATER MASTER SWITCH

HI/LO SWITCH



MASTER CONTROL PANEL

1 **Check if personnel heater blower motor is working.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Set HEATER MASTER switch ON.
- Set PERSONNEL HEATER HI/LO switch ON-LO.
- Listen for sound of personnel heater blower motor running.
- Set PERSONNEL HEATER HI/LO switch ON-HI.
- Listen for sound of personnel heater blower motor.

Can personnel heater blower motor be heard?

YES

NO

2 **Check if PRESS TO TEST indicator lights.**

See Step (23) .

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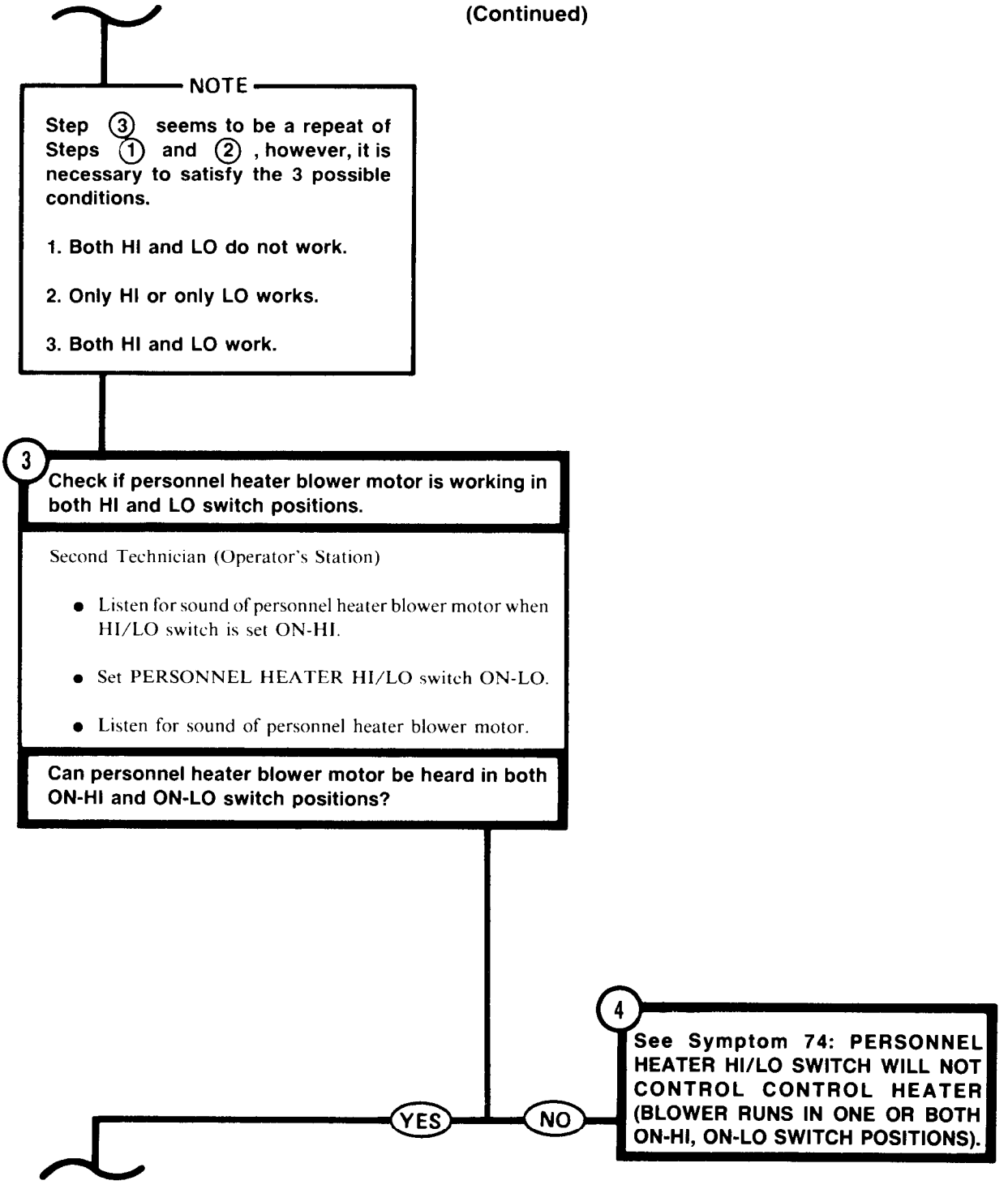
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)



TA250579

Symptom-73

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

5 **Check for fuel flow to personnel heater.**

Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.

First Technician (Personnel Heater)

- Disconnect quick disconnect at personnel heater (push quick disconnect toward right side of vehicle while pulling fuel line connector away from heater).

Second Technician (Operator's Station)

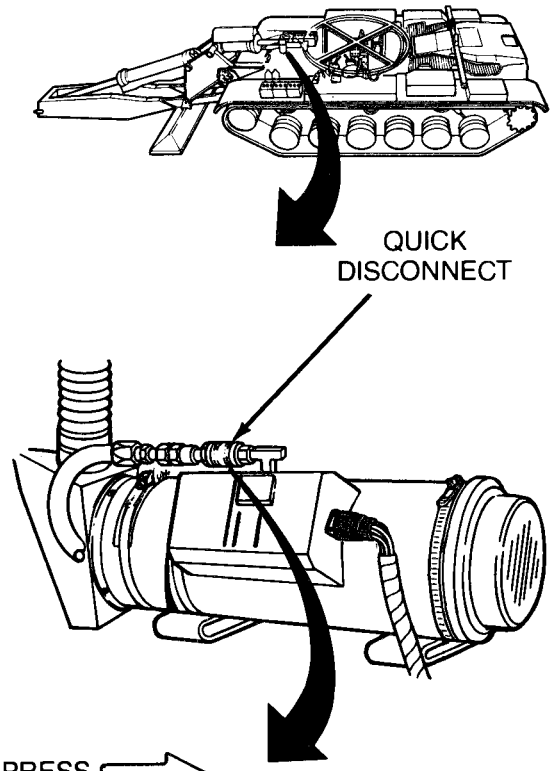
- Set PERSONNEL HEATER HI/LO switch ON-LO.

First Technician (Personnel Heater)

- Hold fuel line connector over suitable container and check for fuel flow.

Does fuel flow from fuel line?

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



PERSONNEL HEATER QUICK DISCONNECT

YES

NO

6

- **Check fuel line to personnel heater fuel pump for damage.**
- **See Step (16) .**

TA250580

Symptom-73

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

7 **Check for electrical power at the left N.O. contact on the flame detector switch.**

Second Technician (Operator's Station)

- Set HEATER MASTER switch OFF.

First Technician (Personnel Heater)

- Loosen two screws and remove personnel heater cover.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to the left N.O. contact on the flame detector switch and black probe to ground.

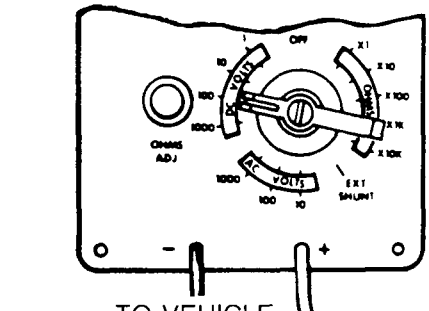
Second Technician (Operator's Station)

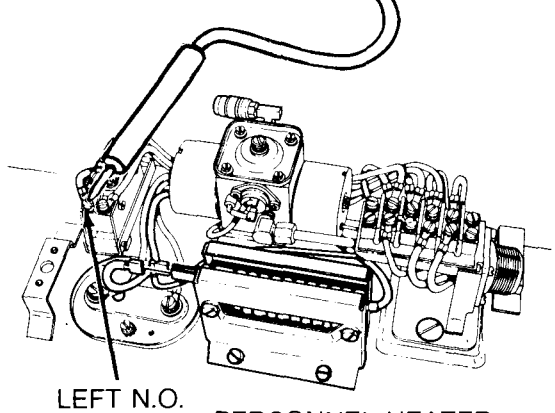
- Set HEATER MASTER switch ON.

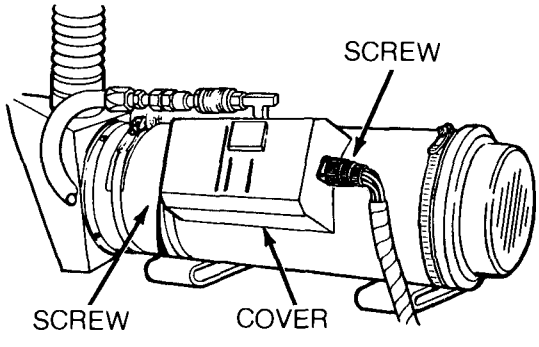
First Technician (Commander's Station)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?







YES

NO

8

- **Set HEATER MASTER switch OFF**
- **Set PERSONNEL HEATER HI/LO switch OFF.**
- **Install personnel heater cover.**
- **Replace personnel heater (page 18-2).**

TA250581

Symptom-73

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

9 **Check for electrical power at right N.O. contact on the flame detector switch.**

Second Technician (Operator's Station)

- Set HEATER MASTER switch OFF.

First Technician (Personnel Heater)

- Connect red probe of meter to the right N.O. contact on the flame detector switch and black probe to ground.

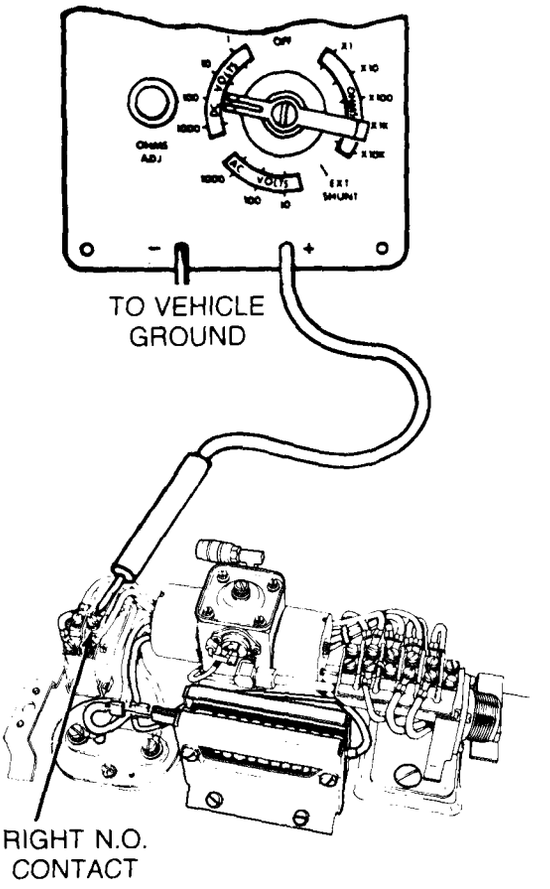
Second Technician (Operator's Station)

- Set HEATER MASTER switch ON.

First Technician (Personnel Heater)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



YES

NO

10

- **Set HEATER MASTER switch OFF.**
- **Set PERSONNEL HEATER HI/LO switch OFF.**
- **Replace flame detector switch (TM 9-2540-205-24&P).**
- **Connect personnel heater fuel line quick disconnect.**

Symptom-73

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

11 **Check for electrical power at white wire connector of ignition control unit.**

Second Technician (Operator's Station)

- Set HEATER MASTER switch OFF.

First Technician (Personnel Heater)

- Connect red probe of meter to the white wire connector of ignition control unit and black probe to ground.

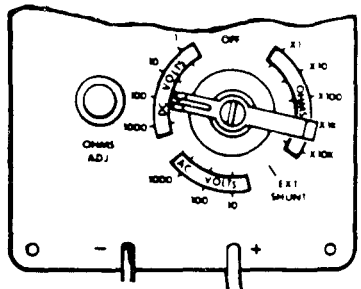
Second Technician (Operator's Station)

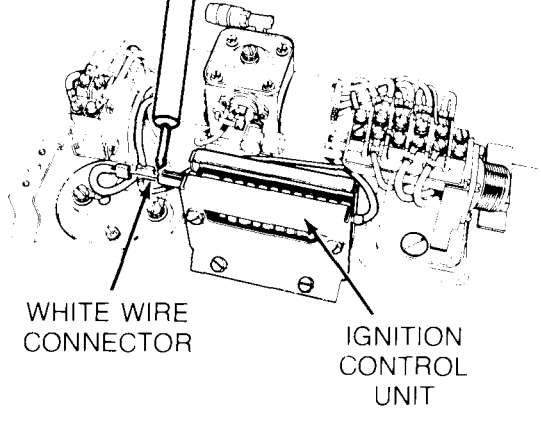
- Set HEATER MASTER switch ON.

First Technician (Personnel Heater)

- Check if meter indicates 8 to 10 volts dc.

Does meter indicate 8 to 10 volts dc?





YES

NO

12

- **Set HEATER MASTER switch OFF.**
- **Set PERSONNEL HEATER HI/LO switch OFF.**
- **Replace ignition control unit (TM 9-2540-205-24&P).**
- **Connect personnel heater fuel line quick disconnect.**

Symptom-73

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

13 **Replace igniter and check heater for proper operation.**

Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.
- Set HEATER MASTER switch OFF.

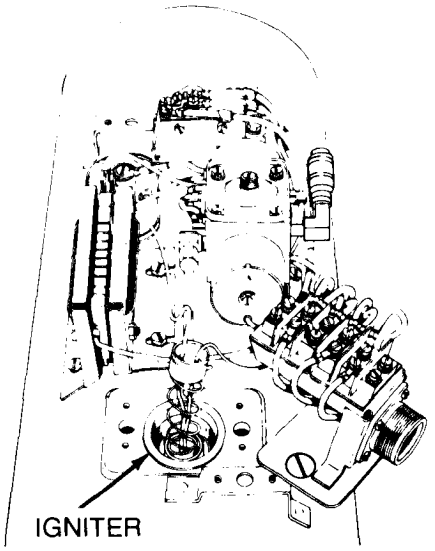
First Technician (Personnel Heater)

- Replace igniter (TM 9-2540-205-24&P).
- Connect personnel heater fuel line quick disconnect.

Second Technician (Operator's Station)

- Operate personnel heater (TM 5-5420-202-10).

Does personnel heater operate correctly?



PERSONNEL HEATER
(IGNITER REPLACEMENT)

YES → **15** **Problem corrected, turn off personnel heater if no longer needed.**

NO → **14**

- **Set PERSONNEL HEATER HI/LO switch OFF.**
- **Set HEATER MASTER switch OFF.**
- **Remove new igniter just installed and replace old igniter in personnel heater.**
- **Replace personnel heater (page 18-2).**

Symptom-73
FROM STEP

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

(6)

16 **Check fuel line to personnel heater fuel pump for damage.**

Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.
- Set HEATER MASTER switch OFF.

First Technician (Personnel Heater)

- Check metal fuel line from primer pump to personnel heater for damage.

Is fuel line damaged?

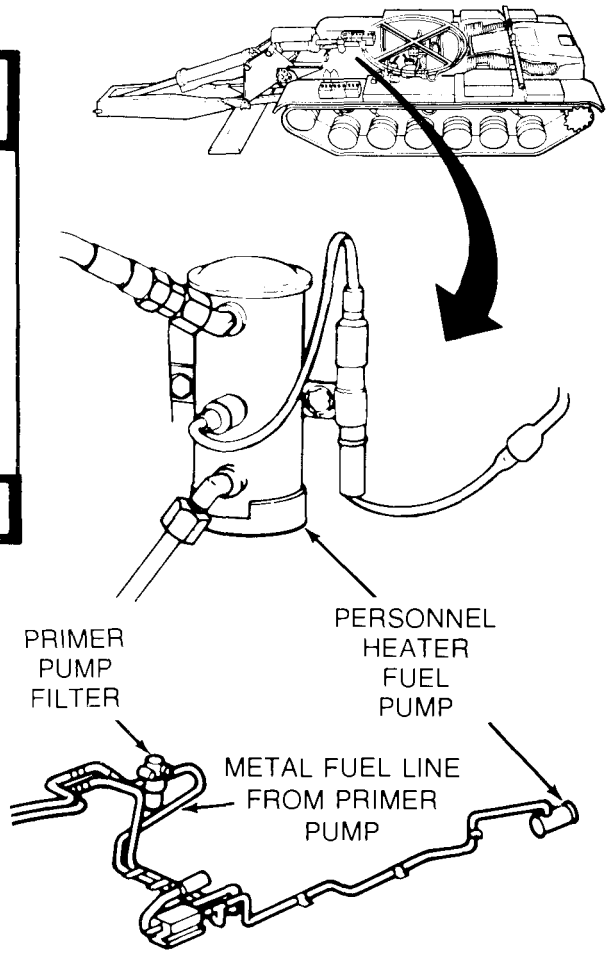
NO

YES

17

- **Replace fuel line from primer pump to personnel heater fuel pump (page 7-289).**
- **Connect fuel line quick disconnect at personnel heater.**

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



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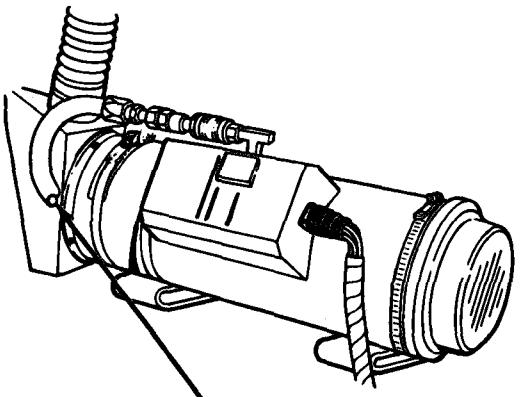
Symptom-73

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

PERSONNEL HEATER



FLEXIBLE FUEL LINE

18 **Check fuel line to personnel heater for damage.**

First Technician (Personnel Heater)

- Check flexible fuel line from personnel heater fuel pump to personnel heater for damage.

Is fuel line damaged?

NO

YES

19 **Replace fuel line from personnel heater fuel pump to personnel heater (page 18-26).**

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DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

Symptom-73

20 **Check for electrical power at personnel heater fuel pump (CKT 402).**

First Technician (Personnel Heater)

- Disconnect harness connector in personnel heater fuel pump power lead.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to harness connector (CKT 402) and black probe to ground.

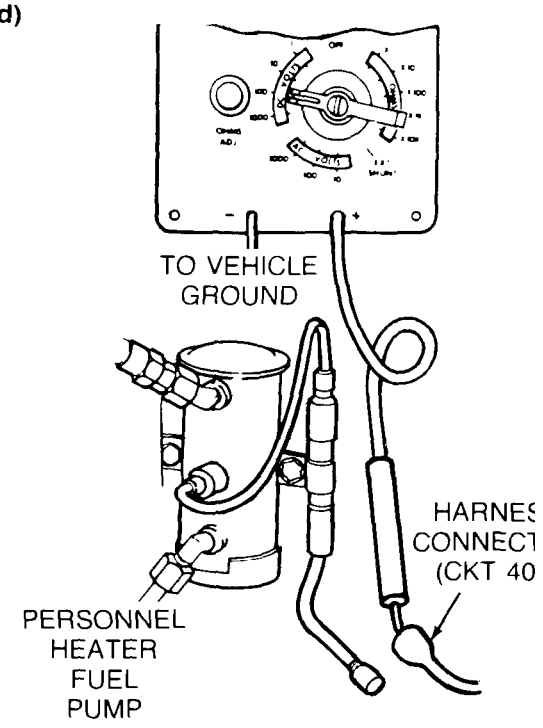
Second Technician (Operator's Station)

- Set HEATER MASTER switch ON.
- Set PERSONNEL HEATER HI/LO switch ON-LO.

First Technician (Personnel Heater)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



YES

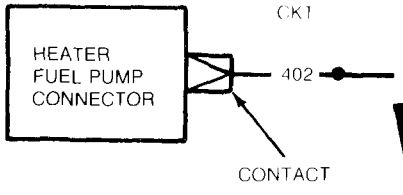
22

- **Set PERSONNEL HEATER HI/LO switch OFF.**
- **Replace personnel heater fuel pump (page 18-24).**
- **Connect fuel line quick disconnect at personnel heater.**

NO

21

- **Set PERSONNEL HEATER HI/LO switch OFF.**
- **Inspect heater to basket disconnect harness for bent/broken connector contact or loose CKT 402 wire at rear of connector.**
- **Repair connector if defective (page 10-298).**
- **If connector is not defective, notify support maintenance of defective heater to basket disconnect harness.**
- **Connect CKT 402 connector at fuel pump.**
- **Connect fuel line quick disconnect at personnel heater.**



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Symptom-73

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

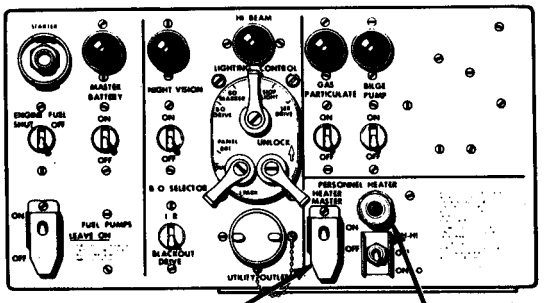
FROM STEP (2)

(23) Check if PRESS TO TEST indicator lights.

Second Technician (Operator's Station)

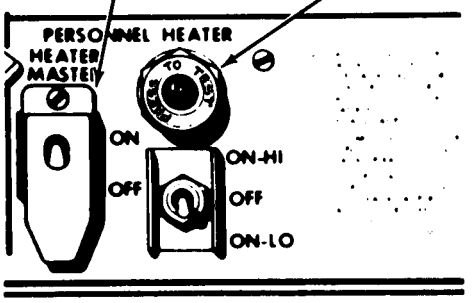
- Push in personnel heater PRESS TO TEST indicator.
- Check if PRESS TO TEST indicator lamp lights.

Does indicator lamp light?



HEATER MASTER SWITCH

PRESS TO TEST INDICATOR



MASTER CONTROL PANEL

YES

NO

(24) Check master control panel power harness (CKT 400) for continuity.

- **See Step (34) .**

TA250588

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

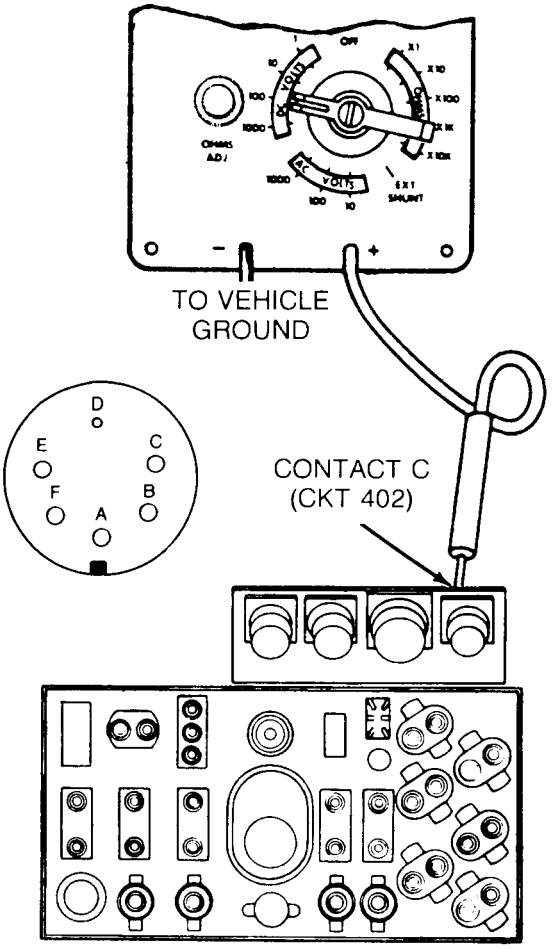
Symptom-73

25 **Check for electrical power at contact C (CKT 402) of control panel heater harness connector.**

Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.
- Set HEATER MASTER switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel heater harness at master control panel.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to panel connector contact C (CKT 402) and black probe to ground.
- Set HEATER MASTER switch ON.
- Set PERSONNEL HEATER HI/LO switch ON-HI.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



MASTER CONTROL PANEL (REAR VIEW)

YES

NO

26 **Check control panel heater harness for continuity from panel connector contact C (CKT 402) to PERSONNEL HEATER HI/LO switch terminal 6 (CKT 402).**

- **See Step (39) .**

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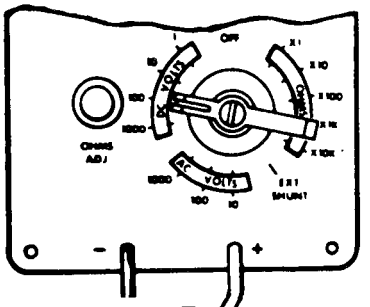
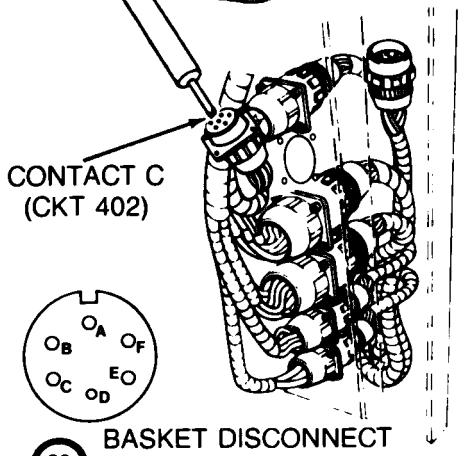
Symptom-73

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)



TO VEHICLE GROUND



27 **Check basket-control panel heater harness connector (CKT 402) at basket disconnect for electrical power.**

Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.
- Connect basket-control panel heater harness connector to master control panel connector.
- **Install master control panel (page 10-33).**

First Technician (Commander's Station)

- Displace basket-control panel heater harness connector **(CKT 402) from basket disconnect.**
- Connect red probe of meter to contact C (CKT 402) of basket-control panel heater harness connector and black probe to ground.

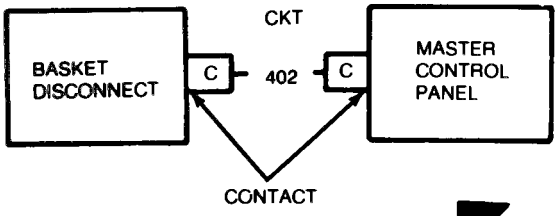
Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch ON-HI.

First Technician (Commander's Station)

- Check if meter indicates 18-30 volts dc.

Does meter indicate 18-30 volts dc?



YES

NO

28

- **Set PERSONNEL HEATER HI/LO switch OFF.**
- **Inspect basket-control panel heater harness for bent/broken connector contacts or loose CKT 402 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective notify support maintenance of bad basket-control panel heater harness.**
- **Install basket-control panel heater harness connector at basket disconnect.**

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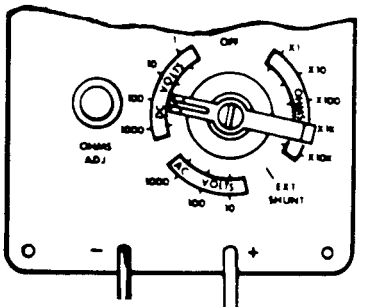
Symptom-73

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)



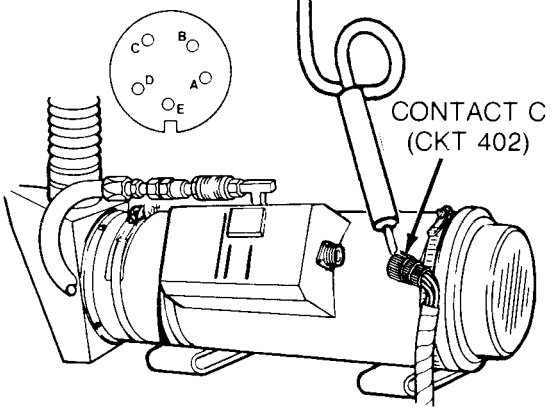
29 **Check for electrical power at heater to basket disconnect harness connector, contact C (CKT 402).**

Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.

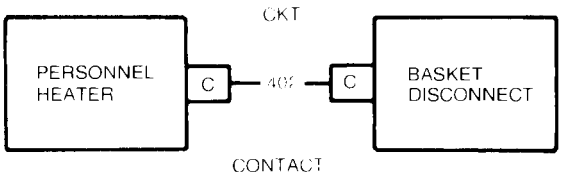
First Technician (Commander's Station)

- Install basket-control panel heater harness at basket disconnect.
- Disconnect heater to basket disconnect harness at personnel heater.
- Connect red probe of meter to harness connector contact C (CKT 402) and black probe to ground.
- Set PERSONNEL HEATER HI/LO switch ON-LO.
- Check if meter indicates 18 to 30 volts dc.



PERSONNEL HEATER

Does meter indicate 18 to 30 volts dc?



YES

NO

30

- **Set PERSONNEL HEATER HI/LO switch OFF.**
- **Inspect heater to basket disconnect harness for bent/broken connector contacts or loose CKT 402 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of bad heater to basket disconnect harness.**
- **Connect heater to basket disconnect harness connector to personnel heater.**

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Symptom-73

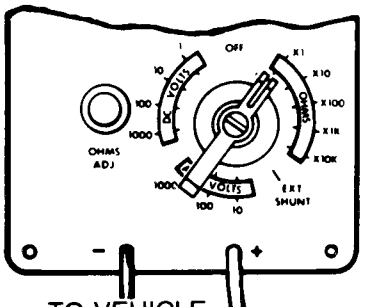
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

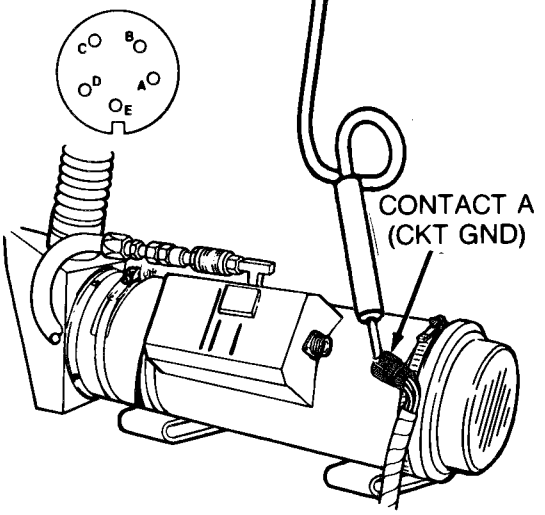
31 **Check heater to basket disconnect harness connector for continuity to ground at contact A (CKT GND).**

Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to heater to basket disconnect harness connector contact A (CKT GND) and black probe to ground.
- Check if meter indicates continuity.

Does meter indicate continuity?



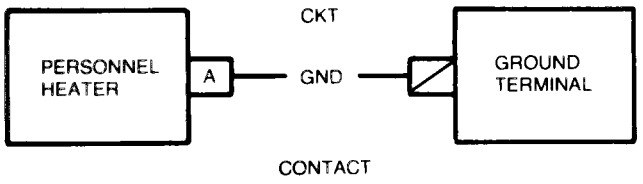


32

- **Inspect heater to basket disconnect harness for bent/broken connector contacts or loose CKT GND wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of bad heater to basket disconnect harness.**
- **Connect heater to basket disconnect harness connector to personnel heater.**

NO — YES

33 **Replace personnel heater (page 18-2).**



TA250592

Symptom-73
FROM STEP

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

(24)

(34) **Check master control panel power harness (CKT 400) for continuity.**

Second Technician (Operator's Station)

- Set PERSONNEL HEATER switch OFF.
- Set HEATER MASTER switch OFF.

WARNING

After disconnecting ground straps, do not allow them to contact any metal surface.

First Technician (Front of Crew Compartment)

- Disconnect three battery ground straps (page 10-268).

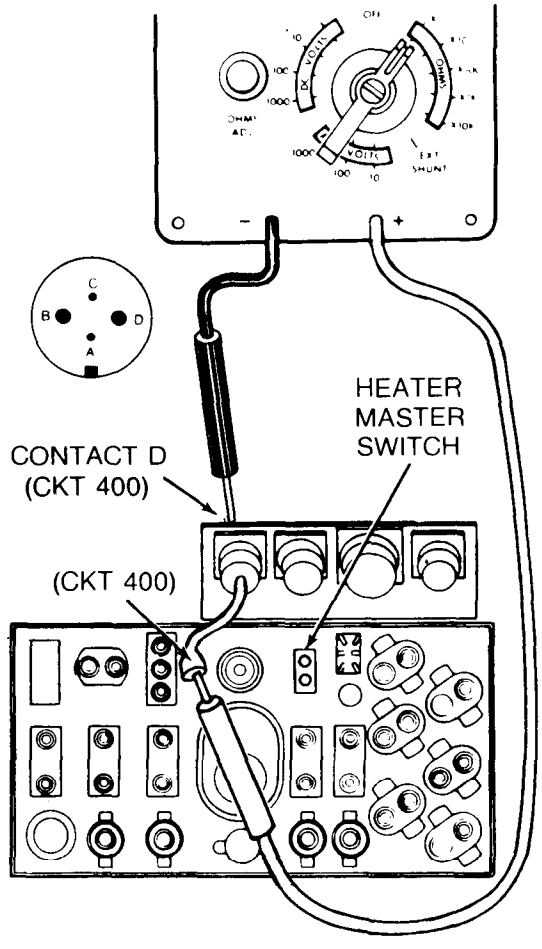
Second Technician (Operator's Station)

- Displace master control panel (page 10-33).
- Disconnect basket-control panel power harness connector (CKT 400-459) from master control panel.
- Disconnect basket-control panel starting harness connector from master control panel.
- Remove 4 screws, nuts and washers from master control panel starting harness connector and unmount connector from master control panel.
- Disconnect control panel power harness connector (CKT 400) at HEATER MASTER switch.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to control panel power harness connector (CKT 400) at HEATER MASTER switch.
- Connect black probe of meter to control panel power harness connector D (CKT 400).
- Check if meter indicates continuity.

Does meter indicate continuity?

YES

NO



MASTER CONTROL PANEL
(REAR VIEW)

(35)

- **Replace master contol panel power harness (page 10-101).**
- **Install control panel starting harness connector in master control panel.**
- **Connect basket-control panel starting harness connector to master control panel.**
- **Connect three battery ground straps (page 10-268).**

TA250593

Symptom-73

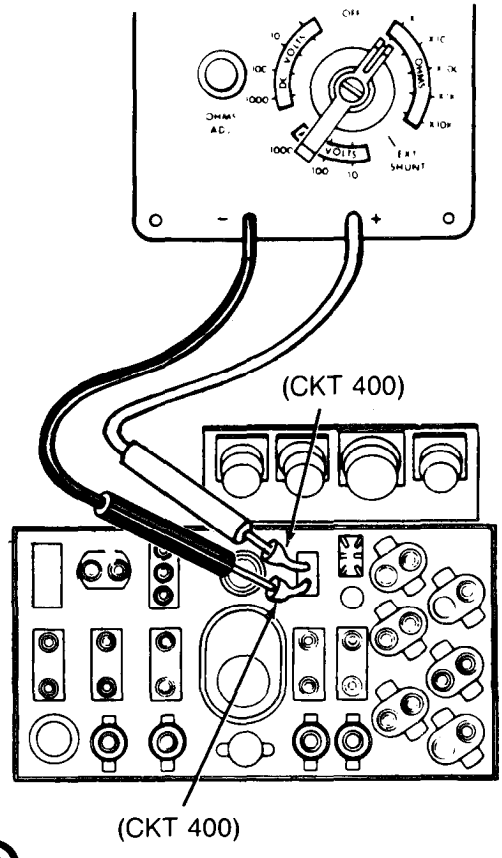
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

36 **Check HEATER MASTER switch for continuity.**

Second Technician (Operator's Station)

- Disconnect control panel heater harness connector (CKT 400, 405) at HEATER MASTER switch.
- Set HEATER MASTER switch ON.
- Connect red probe of meter to one connector of HEATER MASTER switch and black probe to other switch connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



NO

37
- **Replace HEATER MASTER switch (page 10-77).**
- **Connect basket-control panel power harness at master control panel.**
- **Connect 3 battery ground straps (page 10-268).**

YES

38
- **Replace master control panel heater harness (page 10-85).**
- **Connect control panel harness connectors at HEATER MASTER switch.**
- **Connect basket-control panel power harness at master control panel.**
- **Install control panel starting harness connector in master control panel.**
- **Connect basket-control panel starting harness connector to master control panel.**
- **Connect 3 battery ground straps (page 10-268).**

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Symptom-73
FROM STEP

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

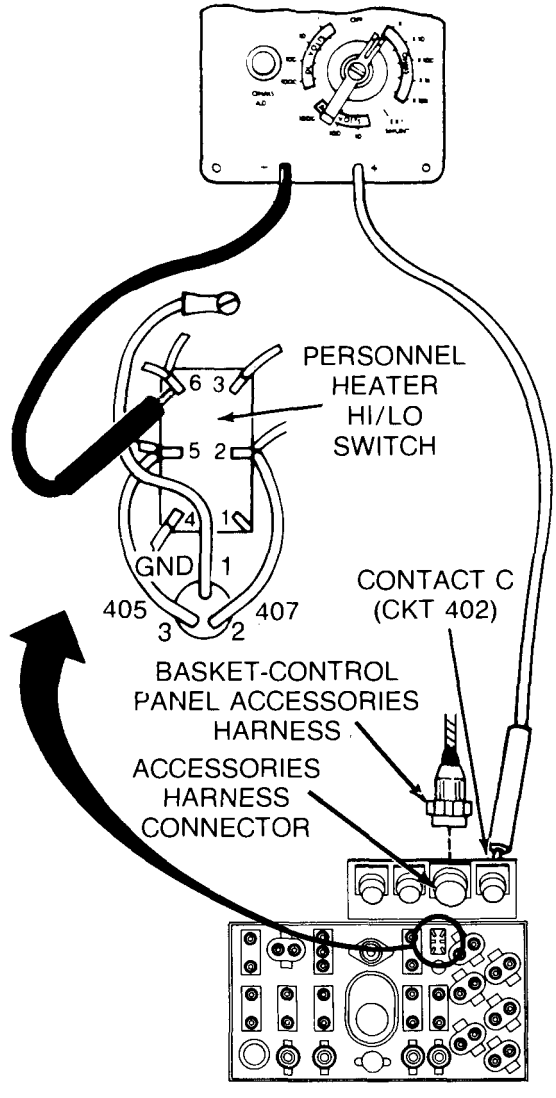
26

39 **Check control panel heater harness for continuity from panel connector contact C (CKT 402) to PERSONNEL HEATER HI/LO switch terminal 6 (CKT 402).**

Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.
- Set HEATER MASTER switch OFF.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Disconnect basket-control panel accessories harness connector from master control panel.
- Remove 4 screws, nuts, and washers from master control panel accessories harness connector and unmount connector from master control panel.
- Connect red probe of meter to panel heater harness connector contact C (CKT 402).
- Connect black probe of meter to PERSONNEL HEATER HI/LO switch terminal 6 (CKT 402).
- Check if meter indicates continuity.

Does meter indicate continuity?



MASTER CONTROL PANEL

YES

40 **Replace personnel HEATER HI/LO switch (page 10-77).**

NO

41 **Replace master control panel heater harness (page 10-85).**

TA250595

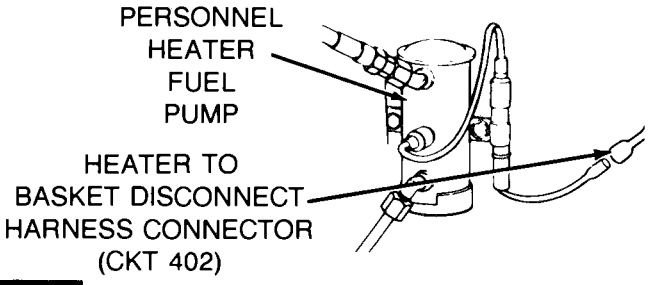
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER

Symptom-74

PERSONNEL HEATER HI/LO SWITCH WILL NOT CONTROL HEATER (BLOWER RUNS IN ONE OR BOTH ON-HI, ON-LO SWITCH POSITIONS).

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



1 Check for personnel heater blower running with PERSONNEL HEATER HI/LO switch in ON-LO position.

Second Technician (Operator's Station)

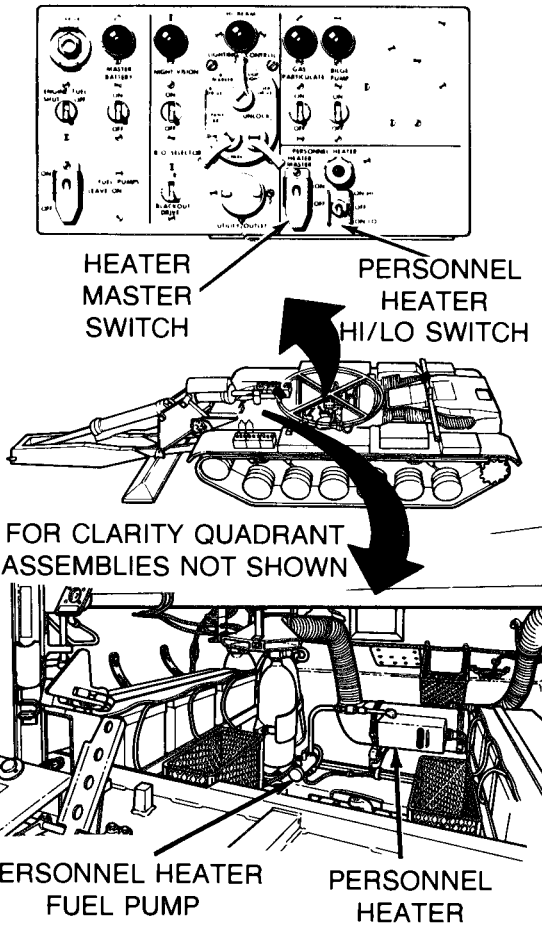
- Set HEATER MASTER switch OFF.
- Set MASTER BATTERY switch OFF.

First Technician (Personnel Heater)

- Disconnect heater to basket disconnect harness connector (CKT 402) from personnel heater fuel pump.

Second Technician (Operator's Station)

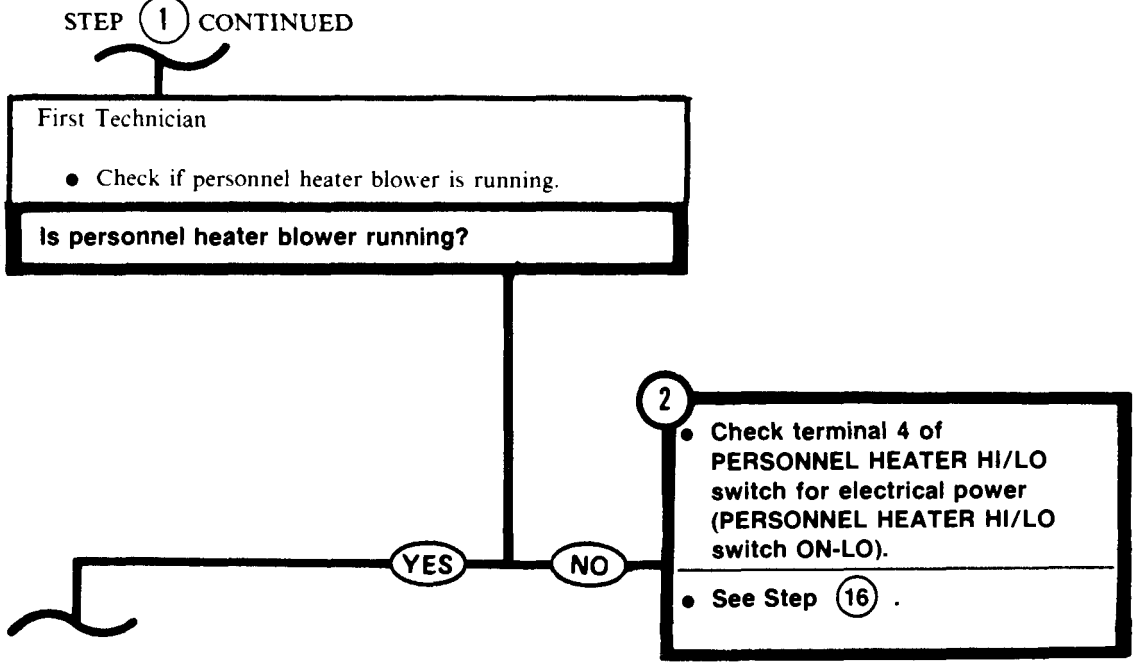
- Set HEATER MASTER switch ON.
- Set PERSONNEL HEATER HI/LO switch ON-LO.



TA250596

Symptom-74

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER



TA250597

Symptom-74

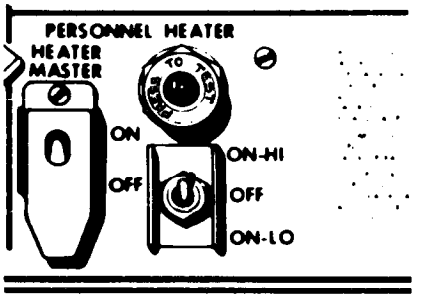
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

3 **Check for personnel heater blower running with PERSONNEL HEATER HI/LO switch ON-HI position.**

Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch ON-HI.
- Check if personnel heater blower motor is running.

Is personnel heater blower running?



MASTER CONTROL PANEL

YES

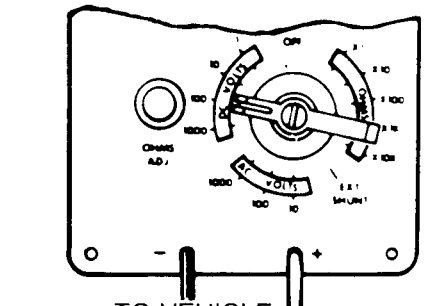
NO

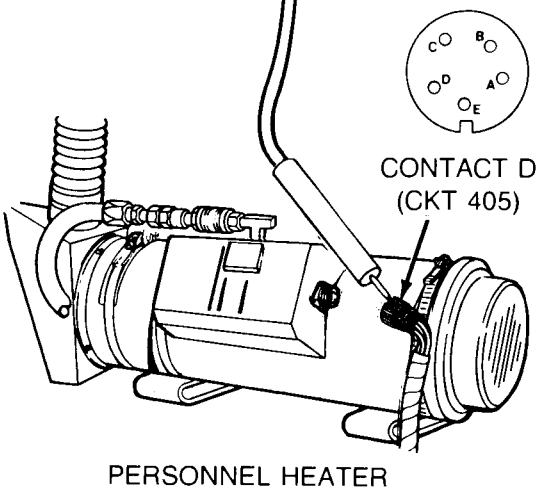
4
- **Replace PERSONNEL HEATER HI/LO switch (page 10-77).**
- **Connect heater to basket disconnect harness connector to personnel heater fuel pump.**

TA250598

Symptom-74

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)





5 **Check heater to basket disconnect harness (CKT 405) at personnel heater for electrical power.**

Second Technician (Operator's Station)

- Set HEATER MASTER switch OFF.

First Technician (Personnel Heater)

- Disconnect heater to basket disconnect harness connector from personnel heater.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact D (CKT 405) of heater to basket disconnect harness connector and black probe to ground.

Second Technician (Operator's Station)

- Set HEATER MASTER switch ON.

First Technician (Personnel Heater)

- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

YES

NO

6

- **Check basket-control panel heater harness (CKT 405) at basket disconnect for electrical power.**

- **See Step (19).**

TA250599

Symptom-74

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

7 **Check heater to basket disconnect harness (CKT 401) from personnel heater to basket disconnect for continuity.**

Second Technician (Operator's Station)

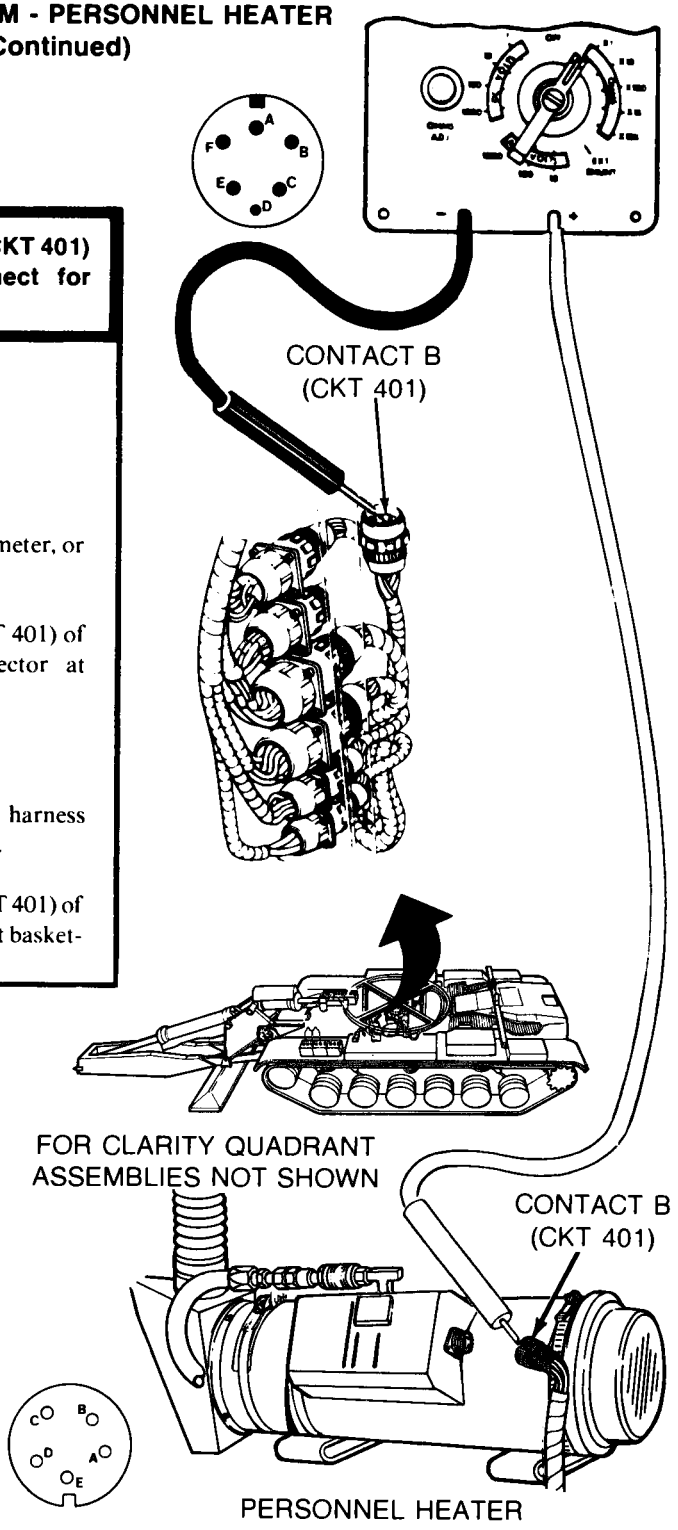
- Set HEATER MASTER switch OFF.

First Technician (Personnel Heater)

- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Connect red probe of meter to contact B (CKT 401) of heater to basket disconnect harness connector at personnel heater.

First Technician (Commander's Station)

- Disconnect heater to basket disconnect harness connector (CKT 401) from basket disconnect.
- Connect black probe of meter to contact B (CKT 401) of heater to basket disconnect harness connector at basket-disconnect.



TA250600

Symptom-74

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

STEP (7) CONTINUED

- Check if meter indicates continuity.

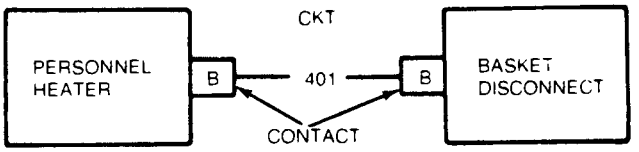
Does meter indicate continuity?

YES

NO

(8)

- **Inspect heater to basket disconnect harness for bent/ broken connector contacts or loose CKT 401 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of defective heater to basket disconnect harness.**
- **Connect heater to basket disconnect harness connector to basket disconnect and personnel heater.**



TA250601

Symptom-74

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

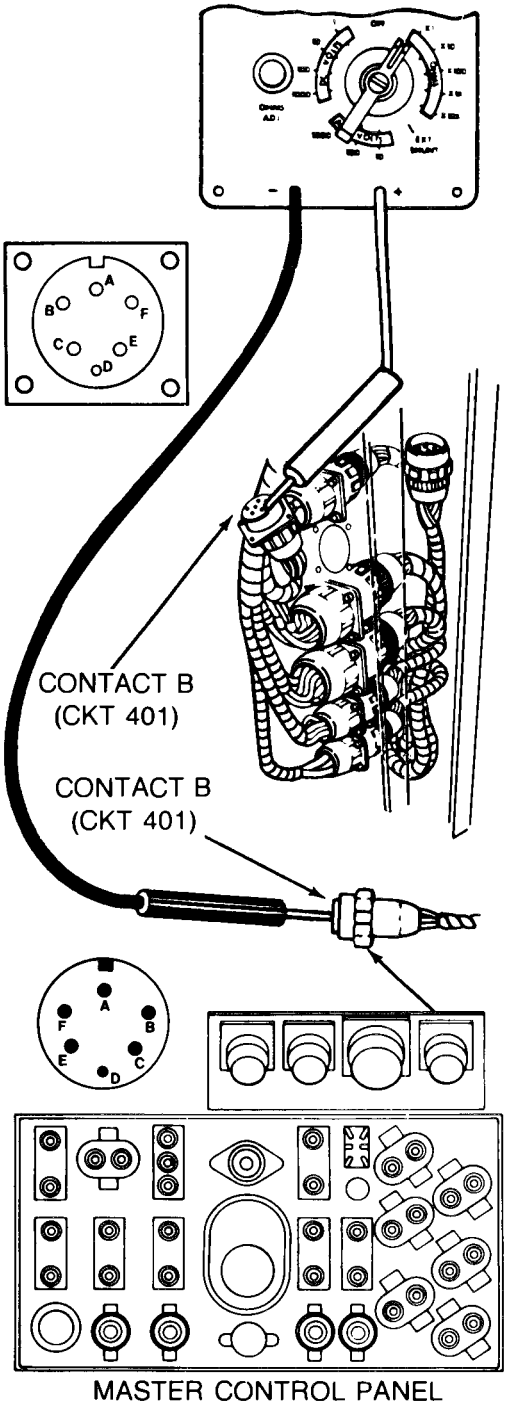
9 **Check basket-control panel heater harness (CKT 401) from basket disconnect to master control panel for continuity.**

First Technician (Commander's Station)

- Displace basket-control panel heater harness connector (CKT 401) at basket disconnect.
- Connect red probe of meter to contact B (CKT 401) of basket-control panel heater harness at basket disconnect.
- Reconnect heater to basket disconnect harness connector to personnel heater.

Second Technician (Operator's Station)

- Displace master control panel (page 10-33).
- Disconnect basket-control panel heater harness connector from master control panel.
- Connect black probe of meter to contact B (CKT 401) of basket-control panel heater harness connector at master control panel.



MASTER CONTROL PANEL
(REAR VIEW)

TA250602

Symptom-74 **DETAILED TROUBLESHOOTING PROCEDURE**
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

STEP (9) CONTINUED

First Technician (Commander's Station)

- Check if meter indicates continuity.

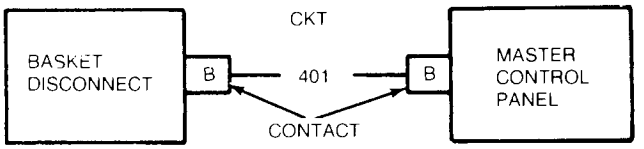
Does meter indicate continuity?

YES

NO

(10)

- **Inspect basket-control panel heater harness for bent/broken connector contacts or loose CKT 401 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective basket-control panel heater harness.**
- **Connect basket-control panel heater harness connector to master control panel.**
- **Install master control panel (page 10-33).**
- **Install basket-control panel heater harness at basket disconnect.**



TA250603

Symptom-74

DETAILED TROUBLESHOOTING PROCEDURE SUPPORT SYSTEM - PERSONNEL HEATER (Continued)

11 **Check PERSONNEL HEATER HI/LO switch between terminals 2 and 3 for continuity (PERSONNEL HEATER HI/LO switch ON-HI).**

First Technician (Commander's Station)

- Install basket-control panel heater harness connector at basket disconnect.

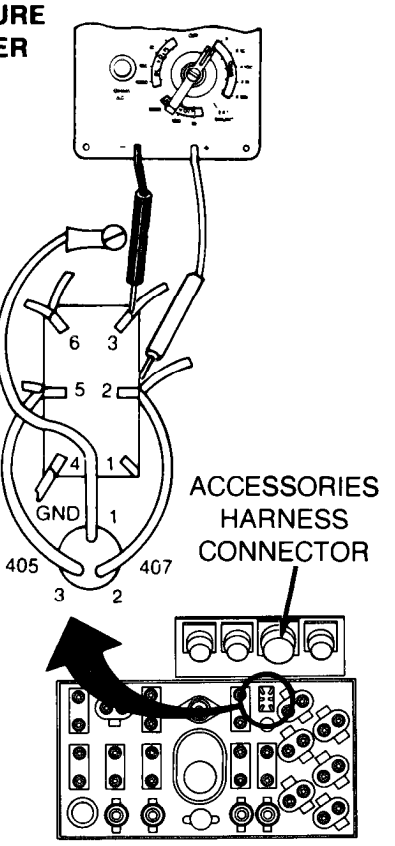
Second Technician (Operator's Station)

- Disconnect basket-control panel accessories harness connector from master control panel.
- Remove 4 screws, nuts and washers from master control panel accessories harness connector and unmount connector from master control panel.
- Set PERSONNEL HEATER HI/LO switch ON-HI.
- Connect red probe of meter to HI/LO switch terminal 2.
- Connect black probe of meter to HI/LO switch terminal 3.
- Check if meter indicates continuity.

Does meter indicate continuity?

YES

NO



12

- **Replace PERSONNEL HEATER HI/LO switch (page 10-77).**
- **Install control panel accessories harness connector in master control panel.**
- **Connect basket-control panel accessories harness connector to master control panel connector.**
- **Connect basket-control panel heater harness connector to master control panel connector.**
- **Install master control panel (page 10-33).**
- **Connect heater to basket disconnect harness connector to personnel heater fuel pump.**

TA250604

Symptom-74

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

13 **Check master control panel PERSONNEL HEATER harness CKT 401 for continuity.**

Second Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.
- Connect red probe of meter to contact B (CKT 401) of master control panel heater harness connector.
- Connect black probe of meter to terminal 3 (CKT 401) of PERSONNEL HEATER HI/LO switch.
- Check if meter indicates continuity.

Does meter indicate continuity?

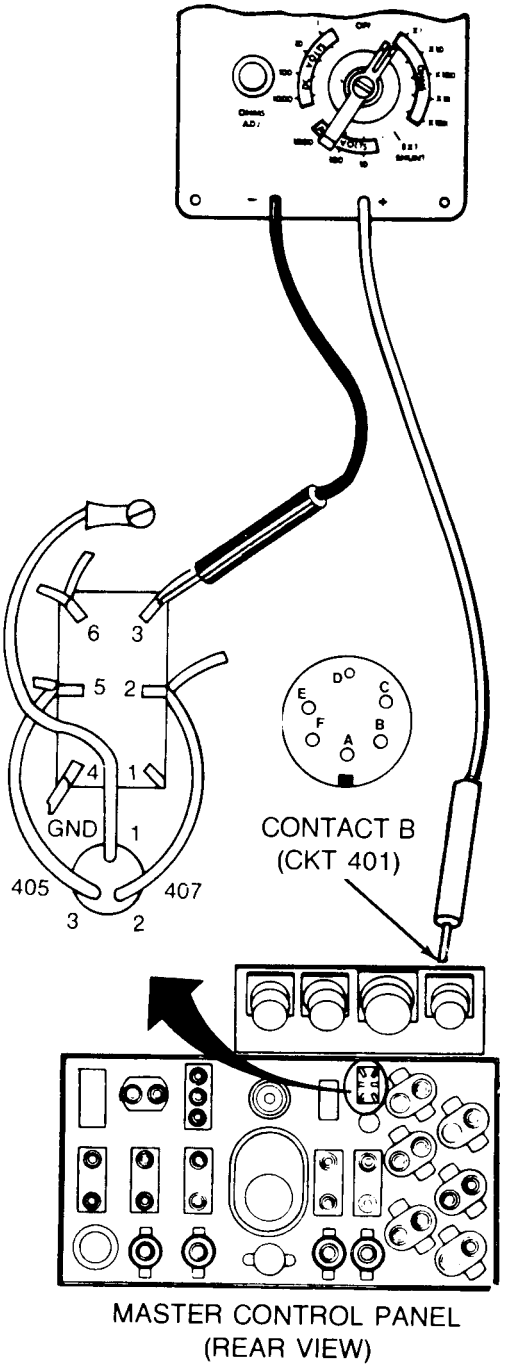
14

- **Replace master control panel heater harness (page 10-85).**
- **Connect master control panel accessories harness connector to master control panel.**
- **Connect basket-control panel accessories harness connector to master control panel.**
- **Connect heater to basket disconnect harness to heater fuel pump.**

NO

15 **Replace personnel heater (page 18-2).**

YES



MASTER CONTROL PANEL
(REAR VIEW)

TA250605

Symptom-74

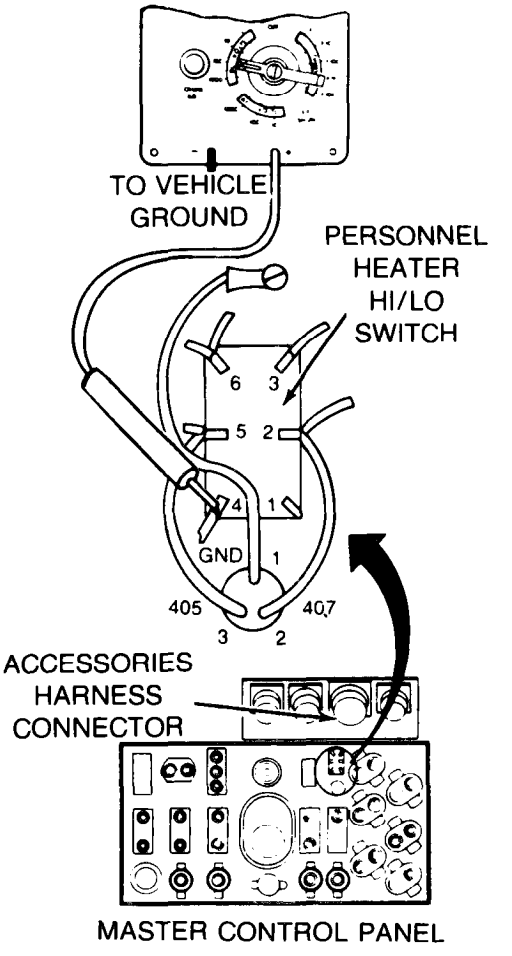
FROM STEP (2)

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

16 **Check terminal 4 of PERSONNEL HEATER HI/LO switch for electrical power. (PERSONNEL HEATER HI/LO switch ON/LO).**

- Set HEATER MASTER switch OFF.
- Displace master control panel (page 10-33).
- Disconnect basket-control panel accessories harness from master control panel accessories harness connector.
- Remove 4 screws, nuts, and washers from master control panel accessories harness connector and unmount connector from master control panel.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to PERSONNEL HEATER HI/LO switch terminal 4 and black probe to ground.
- Set HEATER MASTER switch ON.
- Set PERSONNEL HEATER HI/LO switch ON-LO.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



NO

17
- **Replace PERSONNEL HEATER HI/LO switch (page 10-77).**
- **Connect personnel heater control harness connector to personnel heater fuel pump.**

YES

18
- **Replace PERSONNEL HEATER HI/LO switch jumper lead.**
- **Connect personnel heater control harness connector to personnel heater fuel pump.**

TA250606

Symptom-74

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

FROM STEP 6

19 **Check basket-control panel heater harness (CKT 405) at basket disconnect for electrical power.**

Second Technician (Operator's Station)

- Set HEATER MASTER switch OFF.

First Technician (Personnel Heater)

- Connect heater to basket disconnect harness connector to personnel heater.

First Technician (Commander's Station)

- Displace basket-control panel heater harness (CKT 405) at basket disconnect.
- Connect red probe of meter to contact F (CKT 405) of basket-control panel heater harness connector at basket disconnect and black probe to ground.

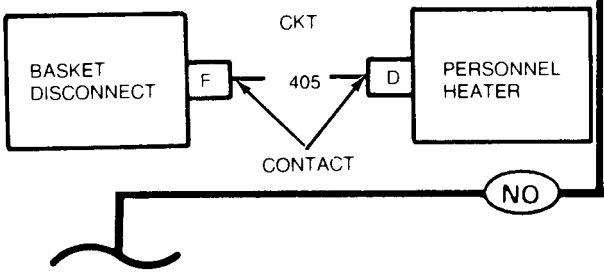
Second Technician (Operator's Station)

- Set HEATER MASTER switch ON.

First Technician (Commander's Station)

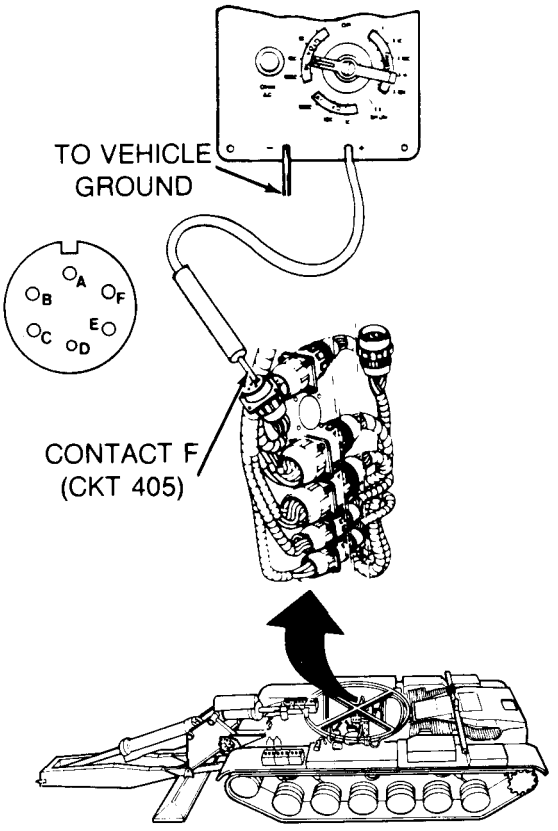
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



NO

YES



FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN

20

- **Inspect heater to basket disconnect harness for bent/ broken connector contacts or loose CKT 405 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of defective heater to basket disconnect harness.**
- **Install basket-control panel heater harness connector at basket disconnect.**

TA250607

Symptom-74

DETAILED TROUBLESHOOTING PROCEDURE SUPPORT SYSTEM - PERSONNEL HEATER (CONTINUED)

21 Check control panel accessories harness connector (CKT 405) for electrical power.

Second Technician (Operator's Station)

- Set HEATER MASTER switch OFF

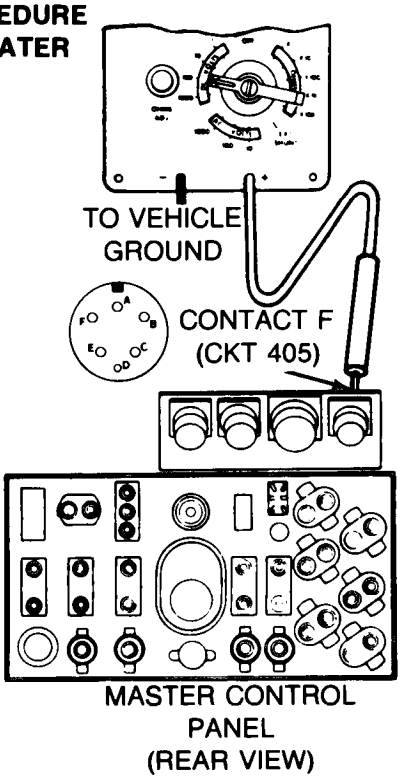
First Technician (Commander's Station)

- Reinstall basket-control panel heater harness connector at basket disconnect.

Second Technician (Commander's Station)

- Displace master control panel (page 10-33).
- Disconnect basket-control panel heater harness connector from master control panel.
- Connect red probe of meter to contact F (CKT 405) of control panel heater harness connector and black probe to ground.
- Set HEATER MASTER switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



22

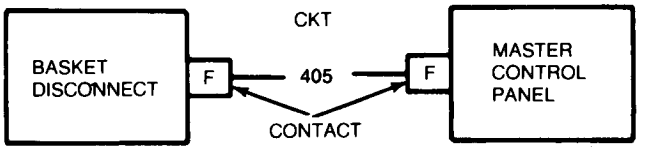
- **Replace master control panel personnel heater harness (page 10-85).**
- **Connect heater to basket disconnect harness to personnel heater fuel pump.**

NO

YES

23

- **Inspect basket-control panel heater harness for bent/broken connector contacts or loose CKT 405 wire at rear of connectors.**
- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of defective basket-control panel heater harness.**
- **Connect basket-control panel heater harness to master control panel.**
- **Install master control panel (page 10-33).**



TA250608

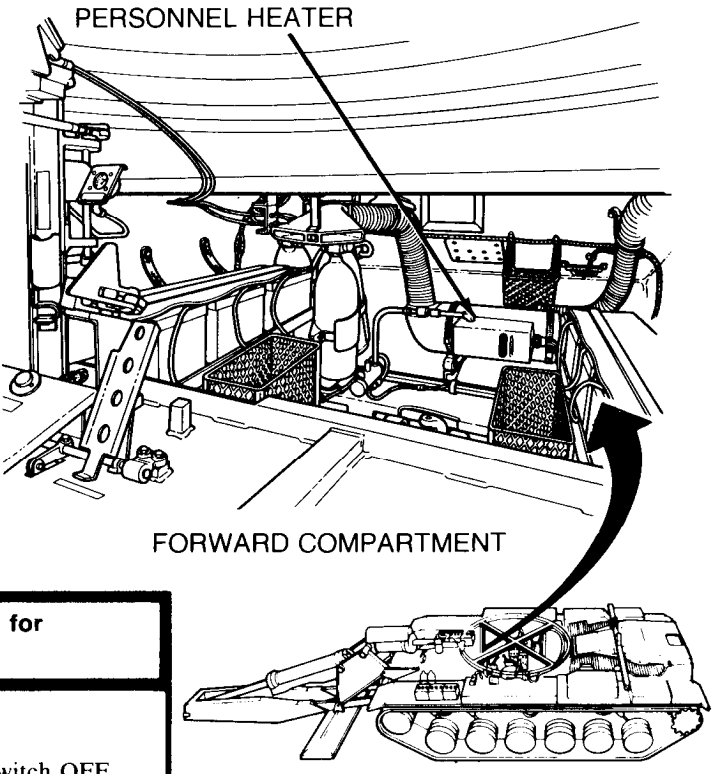
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER

Symptom-75

PERSONNEL HEATER STARTS, WORKS FOR A SHORT TIME, THEN STOPS.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



1 Check personnel heater air intake grille for obstructions.

First Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.

Second Technician (At Personnel Heater)

- Check personnel heater air intake grille for obstructions.

Is air intake grille obstructed?

NO

YES

2 Clear obstructions from air intake grille.

TA250609

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

Symptom-75

3 **Check personnel heater duct for air flow at deflector.**

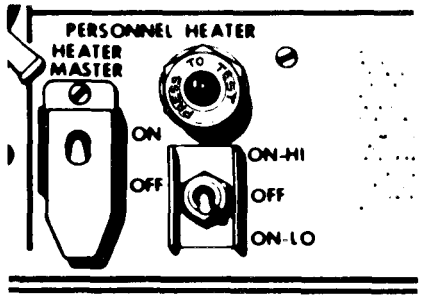
First Technician (Operator's Station)

- Check that HEATER MASTER ON/OFF switch is ON.
- Set PERSONNEL HEATER HI/LO switch ON-LO.

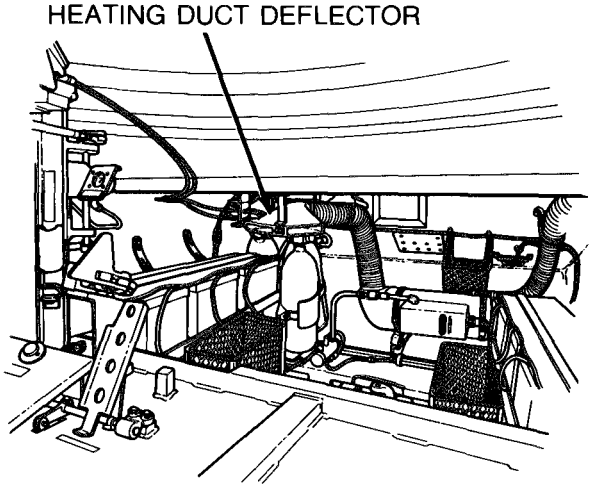
Second Technician (At Personnel Heater)

- Place hand in front of heating duct deflector and check for air flow.

Is air flow present at deflector?



MASTER CONTROL PANEL



NO

YES

4 **Replace personnel heater (page 18-2).**

TA250610

Symptom-75

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

5 **Check personnel heater air duct and deflector for obstructions or damage.**

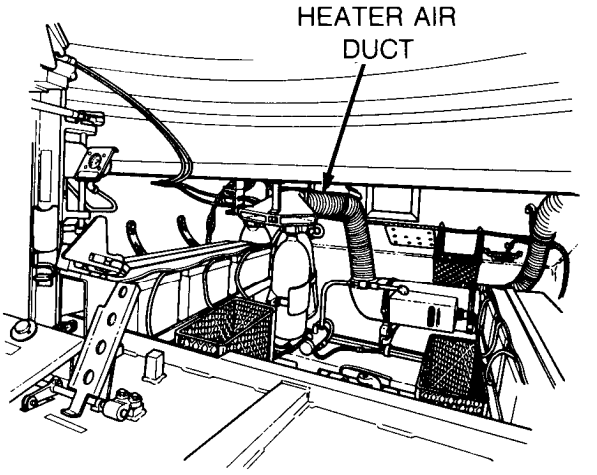
First Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.

Second Technician (At Personnel Heater)

- Remove heater duct from rear of deflector.
- Look into duct opening and check for obstructions.
- Check deflector for obstructions.
- Check heater duct for crimps or other damage.

Is the air duct or deflector clogged or damaged?



YES

6
- **Remove obstructions in heater duct or deflector.**
- **Replace damaged heater duct or deflector.**

NO

7
- **Replace personnel heater (page 18-2).**
- **Install heater duct on deflector.**

TA250611

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER

Symptom-76

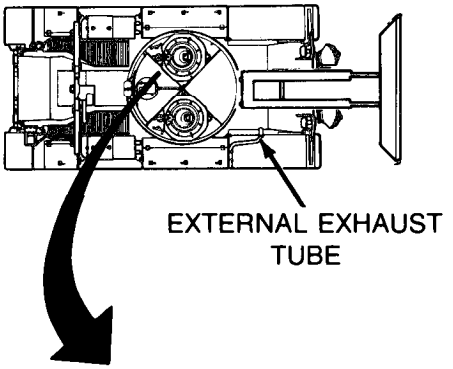
EXHAUST FUMES FROM PERSONNEL HEATER INSIDE VEHICLE.

WARNING

Exposure to exhaust fumes in an enclosed area can be dangerous to your health.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.



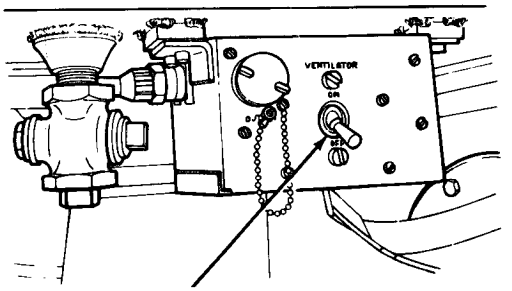
1 Check external exhaust tube for damage or obstructions.

First Technician (Operator's Station)

- Set PERSONNEL HEATER HI/LO switch OFF.
- Set MASTER BATTERY switch ON.
- Set VENTILATOR switch ON (TM 5-5420-202-10) and allow blower motor to run until exhaust fumes are cleared from vehicle.
- Set VENTILATOR switch OFF.
- Set MASTER BATTERY switch OFF.

Second Technician (Right Front Fender)

- Look into opening of external exhaust tube and check for obstructions.
- Check external exhaust tube for damage.



Is external exhaust tube obstructed or damaged?

NO

YES

2

- **Remove obstructions from external exhaust tube.**
- **If exhaust tube is not obstructed, replace damaged external exhaust tube (page 18-22).**

TA250612

Symptom-76

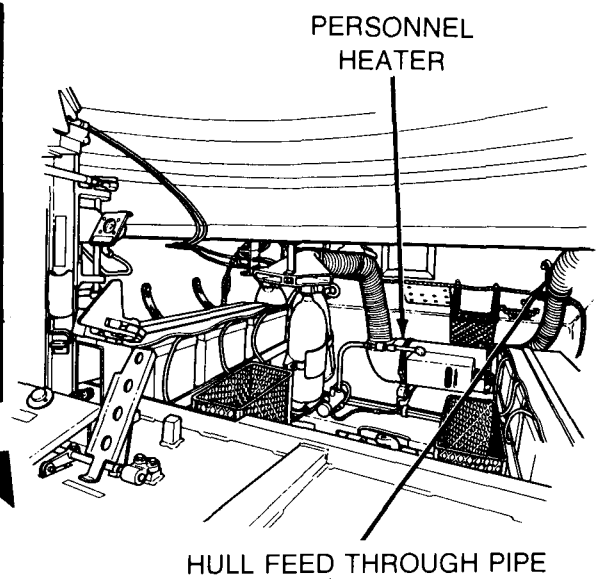
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - PERSONNEL HEATER
(Continued)

3 **Check for loose coupling clamps on internal exhaust pipe.**

First Technician (Personnel Heater)

- Check if coupling clamp is loose at personnel heater.
- Check if coupling clamp is loose at hull feed through pipe.

Are internal exhaust pipe coupling clamps loose?

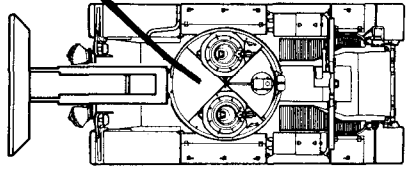


4 **Tighten loose internal exhaust pipe coupling clamps.**

YES

5 **Replace personnel heater (page 18-2).**

NO



TA250613

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR

Symptom-77

SMOKE GENERATOR WILL NOT WORK (NO SMOKE OR QUANTITY OF SMOKE IS NOT NORMAL).

WARNING

Never activate smoke generator in a building, closed area, or with personnel nearby.

NOTE

This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

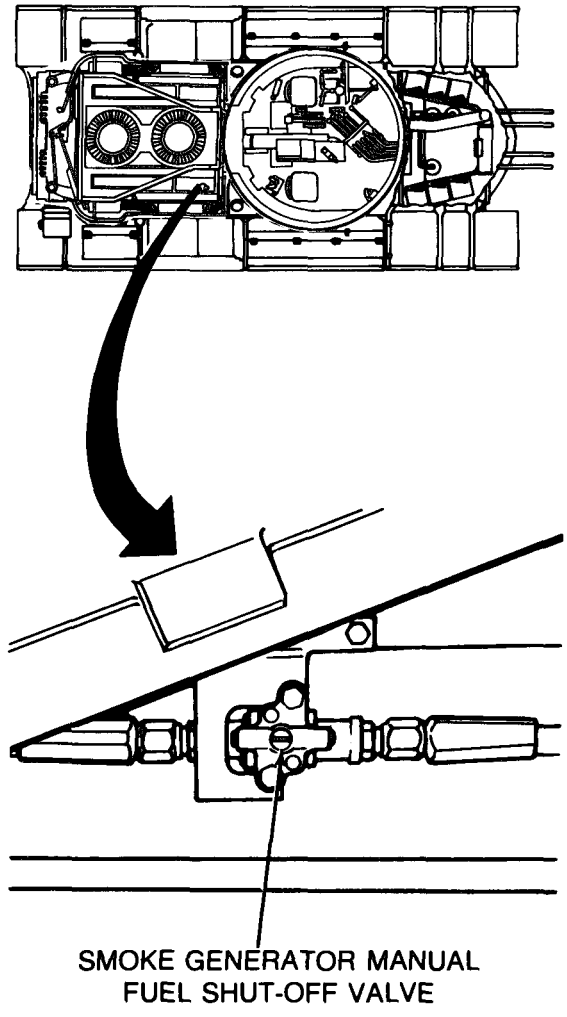
1 Check if smoke generator makes white smoke.

First Technician (Top Deck)

- Open right top deck grille doors.
- Make sure smoke generator manual fuel shut-off valve is in open position (screw slot in line with fuel line).

First Technician (Side of Vehicle)

- Note wind direction.
- Move vehicle to a safe position.



TA250614

Symptom-77

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)

STEP (1) CONTINUED

Second Technician (Operator's Station)

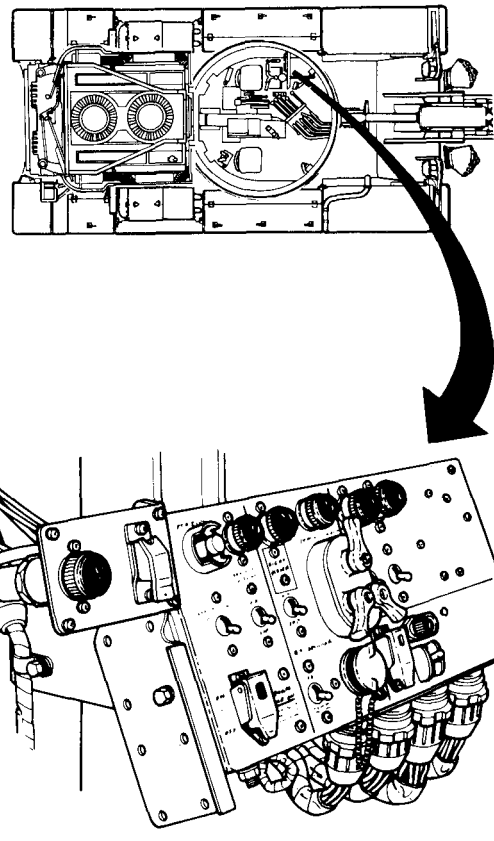
- Start engine and allow it to warm up.
- Set engine speed at 1600 rpm.
- Set SMOKE GENERATOR switch ON for ten seconds then OFF.

First Technician (Side of Vehicle)

- Look for white smoke coming from engine exhaust.

Is white smoke emitted?

FOR CLARITY QUADRANT ASSEMBLIES NOT SHOWN



NO

YES

(2)

- **Check fuel lines and fittings for leaks or damage.**
- **See Step (20) .**

TA250615

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)

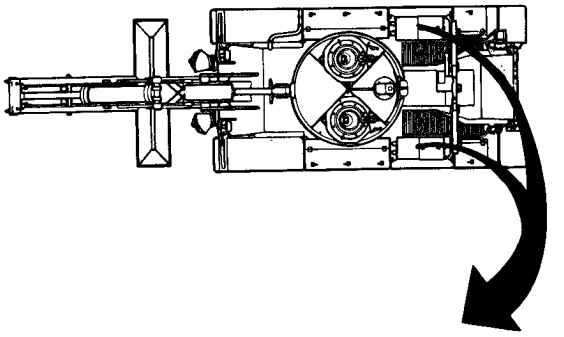
Symptom-77

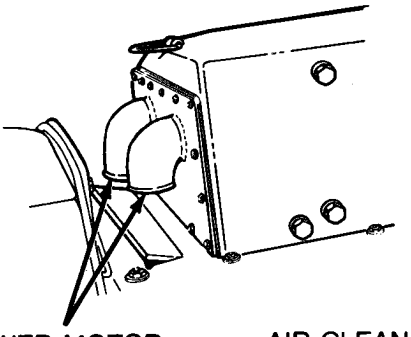
3 **Check if any air cleaner blower motors are running.**

First Technician (Top Deck)

- Check if air exhaust can be felt at any of the four blower motor elbows.

Are any air cleaner blower motors running?





BLOWER MOTOR ELBOWS

AIR CLEANER (LEFT SIDE SHOWN)

YES

NO

4 **Refer to Symptom No. 14: ALL AIR CLEANER BLOWER FANS WILL NOT WORK.**

TA250616

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)

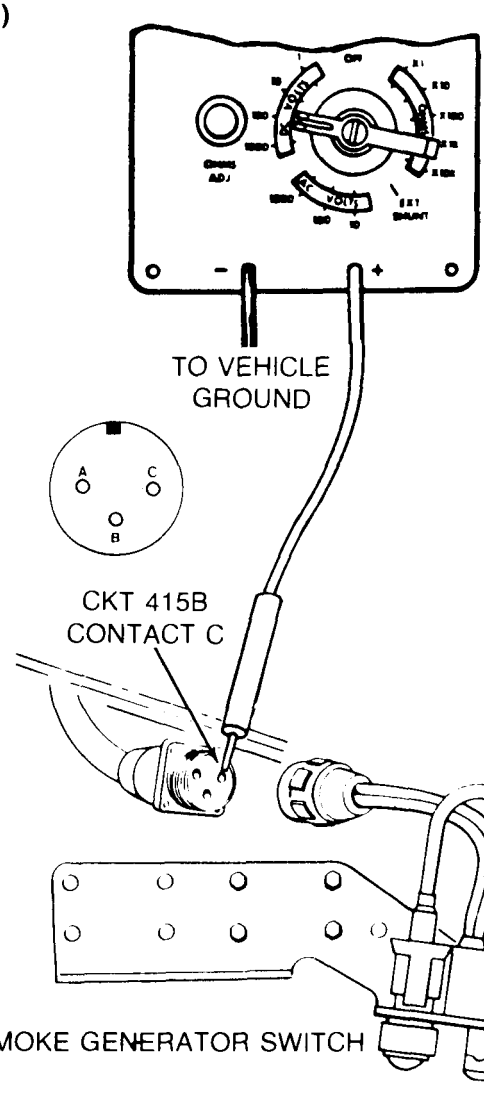
Symptom-77

5 **Check smoke generator switch harness (CKT 415B) at SMOKE GENERATOR switch for electrical power.**

Second Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect smoke generator switch harness connector from SMOKE GENERATOR switch connector.
- Set multimeter to measure 18 to 30 volts dc, or use STE/ICE Test No. 89 (page 4-81).
- Connect red probe of meter to contact C (CKT 415B) of smoke generator switch harness connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

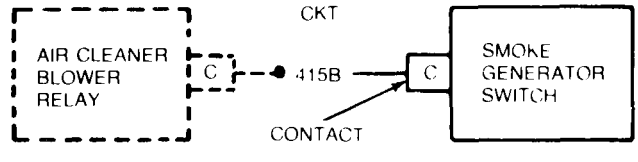
Does meter indicate 18 to 30 volts dc?



YES

NO

6 **Repair smoke generator switch harness (CKT 415B) (page 10-298).**



TA250617

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)

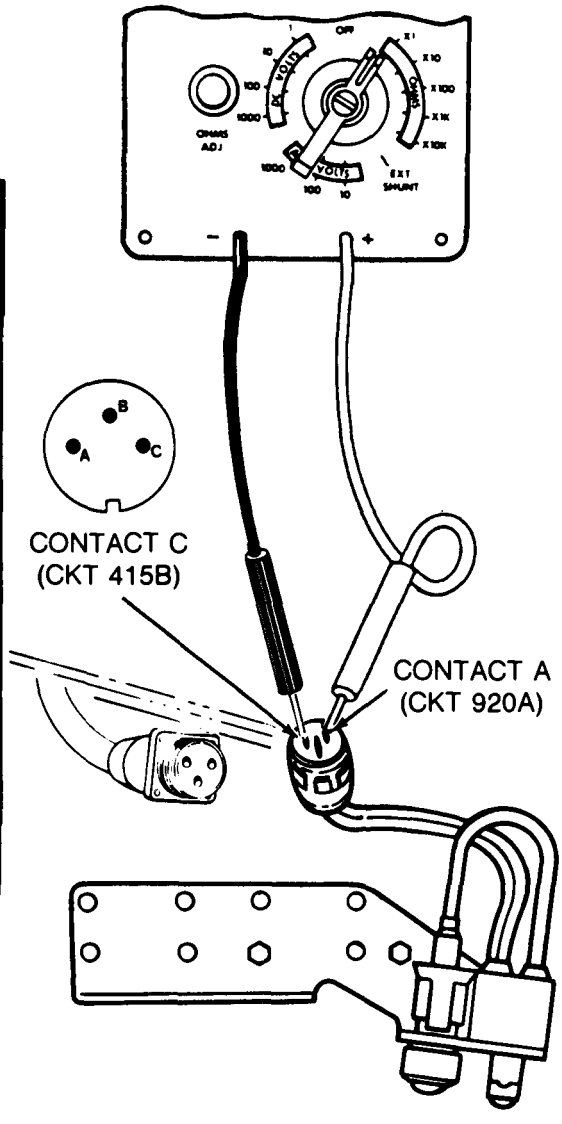
Symptom-77

7 **Check SMOKE GENERATOR switch assembly connector for continuity from contact A to contact C.**

Second Technician (Operator's Station)

- Stop engine.
- Set multimeter to OHMS X1 scale and "zero" meter, or use STE/ICE Test No. 91 (page 4-83).
- Set SMOKE GENERATOR switch ON.
- Connect red probe of meter to contact A of switch assembly connector.
- Connect black probe of meter to contact C of switch assembly connector.
- Check if meter indicates continuity.

Does multimeter indicate continuity?



YES

NO

8 **Replace SMOKE GENERATOR switch assembly (page 21-2).**

TA250618

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)

Symptom-77

9 **Check smoke generator switch harness (CKT 920A) for continuity from switch assembly to lead assembly at bulkhead disconnect.**

First Technician (Commander's Station)

- Disconnect smoke generator switch harness connector from CKT 920A lead assembly connector at bulkhead disconnect.

Second Technician (Operator's Station)

- Set SMOKE GENERATOR switch OFF.
- Connect red probe of meter to smoke generator switch harness connector contact A (CKT 920A) at SMOKE GENERATOR switch.

First Technician (Commander's Station)

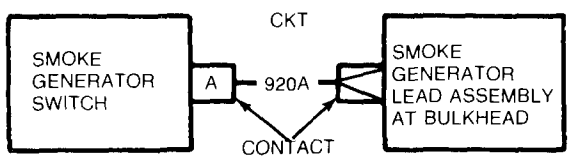
- Connect black probe of meter to smoke generator switch harness at lead assembly (CKT 920A) at bulkhead electrical disconnect.

Second Technician (Operator's Station)

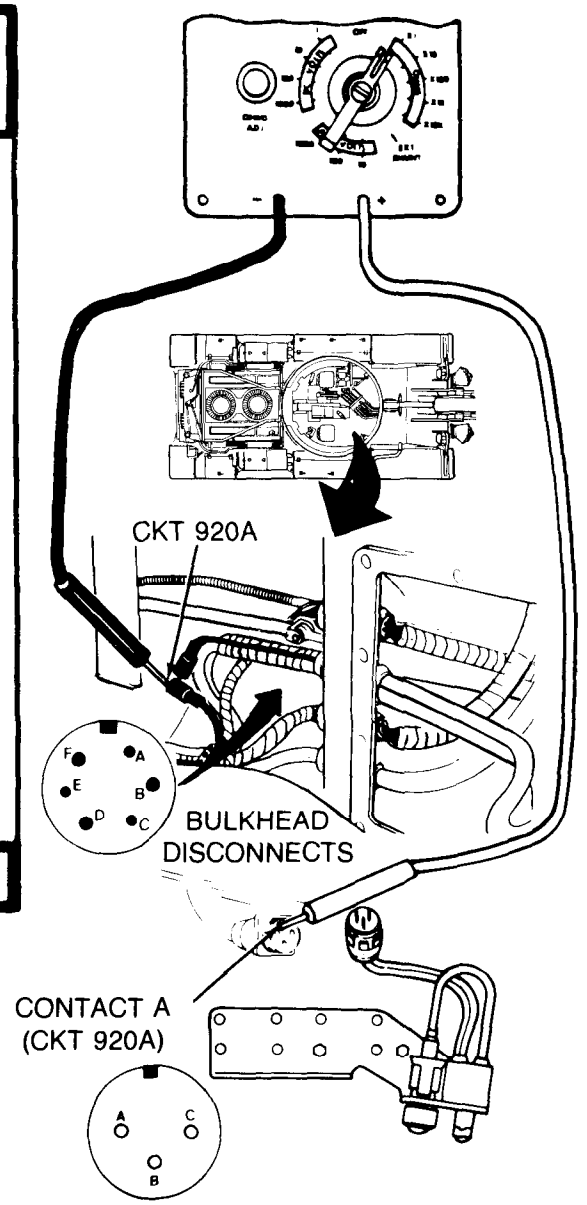
- Check if meter indicates continuity.

Does meter indicate continuity?

10 **Repair smoke generator switch harness (CKT 920A) (page 10-298).** NO



YES



TA250619

Symptom-77

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)

WARNING

Use extreme care when working with circuit 81. This circuit carries battery voltage at all times whether MASTER BATTERY switch is ON or OFF.

WARNING

Do not allow battery ground straps to come in contact with vehicle chassis or ground while disconnected.

11 Check CKT 920A lead through starter harness connector at bulkhead electrical disconnect.

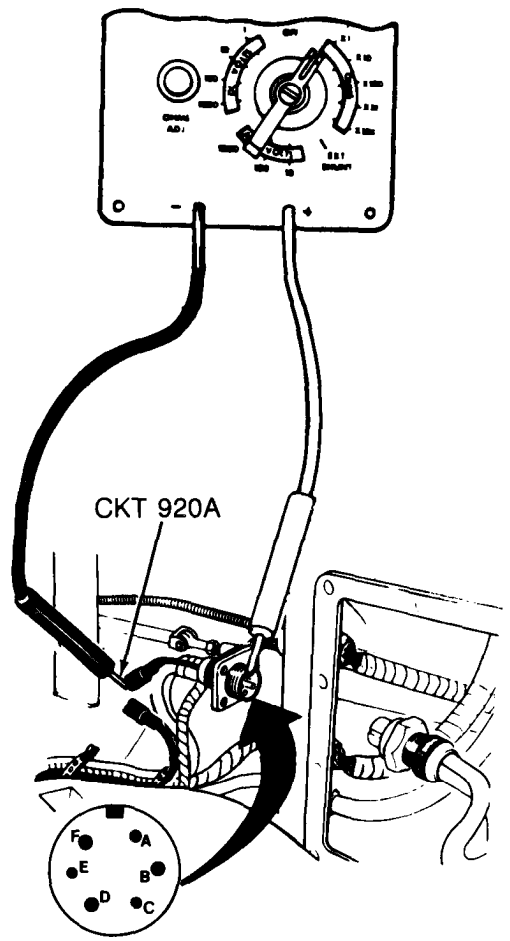
Second Technician (Operator's Station)

- Disconnect 3 battery ground straps (page 10-268).
- Reconnect smoke generator switch harness connector to switch connector.

First Technician (Commander's Station)

- Disconnect starter harness from bulkhead disconnect.
- Connect red probe of meter to starter harness connector A (CKT 920A).
- Connect black probe of meter to lead assembly connector CKT 920A at bulkhead electrical disconnect.
- Check if meter indicates continuity.

Does meter indicate continuity?

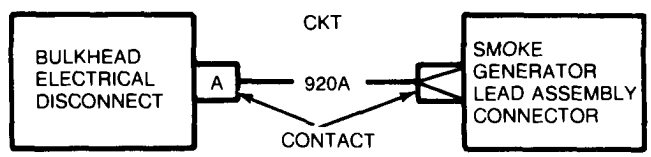


CONTACT A
(CKT 920A)

YES

NO

12 Repair smoke generator lead assembly (page 10-298).



TA250620

Symptom-77

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)

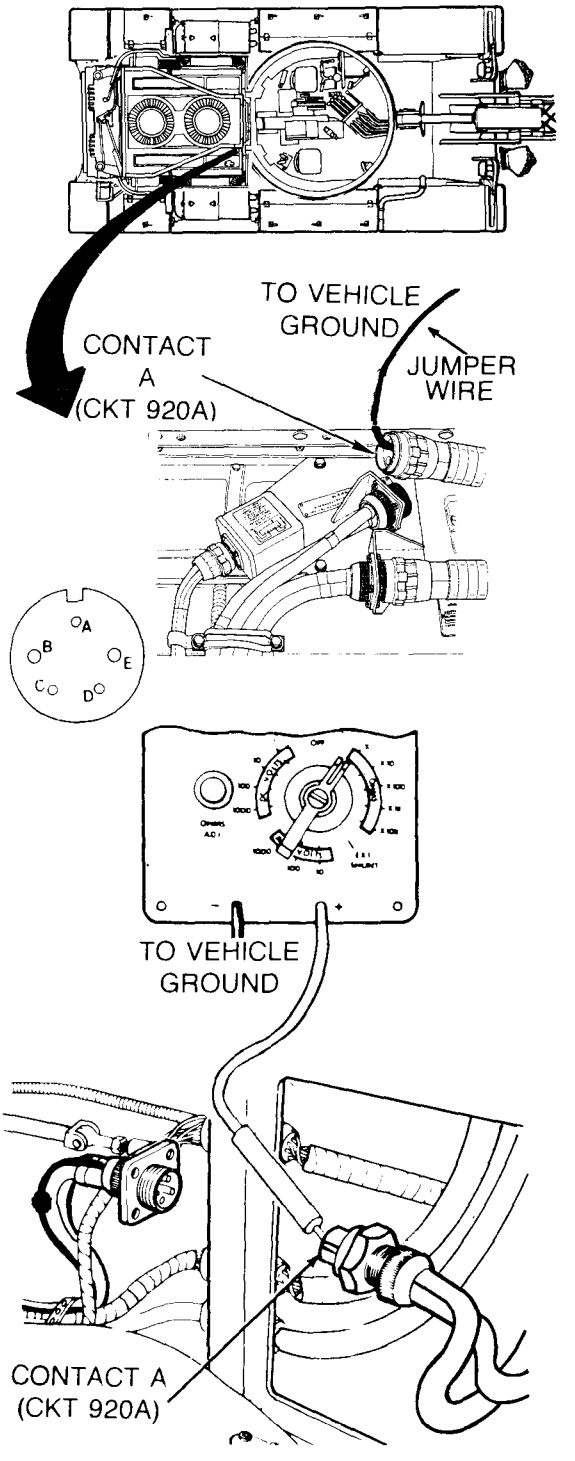
13 **Check starter feed harness (CKT 920A) for continuity from bulkhead disconnect to engine disconnect.**

Second Technician (Top Deck)

- Open right top deck grille doors.
- Disconnect starter feed harness connector from starter motor harness at engine disconnect.
- Connect jumper wire from starter feed harness connector contact A (CKT 920A) to ground.

First Technician (Commander's Station)

- Disconnect CKT 920A lead connector at bulkhead electrical disconnect to smoke generator harness connector.
- Connect smoke generator switch harness connector CKT 920A lead assembly connector.
- Connect red probe of meter to starter feed connector contact A (CKT 920A) at bulkhead electrical disconnect and black probe to ground.



TA250621

Symptom-77 **DETAILED TROUBLESHOOTING PROCEDURE**
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)

STEP 13 CONTINUED

- Check if meter indicates continuity.

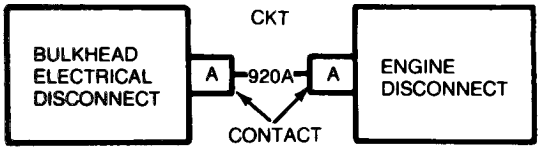
Does meter indicate continuity?

NO

14

Inspect starter feed harness for bent/broken connector contacts or loose CKT 920A wire at rear of connectors.

- **Repair connectors if defective (page 10-298).**
- **If connectors are not defective, notify support maintenance of a defective starter feed harness.**
- **Connect battery slave cable to bulkhead electrical disconnects.**
- **Connect starter feed harness connector to engine disconnect.**



YES

TA250622

Symptom-77

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)

15 **Check smoke generator engine harness (CKT 920A) for continuity from engine disconnect to both harness connectors at solenoid valves.**

First Technician (Commander's Station)

- Reconnect battery slave cable to bulkhead electrical disconnect.

Both Technicians (Rear of Vehicle)

- Remove transmission shroud (page 9-2).

First Technician (Rear of Vehicle)

- Disconnect both smoke generator engine harness connectors from the solenoid valves.
- Connect red probe of meter to contact A (CKT 920A) of one smoke generator engine harness connector at solenoid valves.

Second Technician (Top Deck)

- Connect black probe of meter to contact A (CKT 920A) of starter motor harness connector.

First Technician (Rear of Vehicle)

- Check if meter indicates continuity.
- Connect red probe of meter to contact A of other smoke generator engine harness connector at solenoid valves.
- Check if meter indicates continuity.

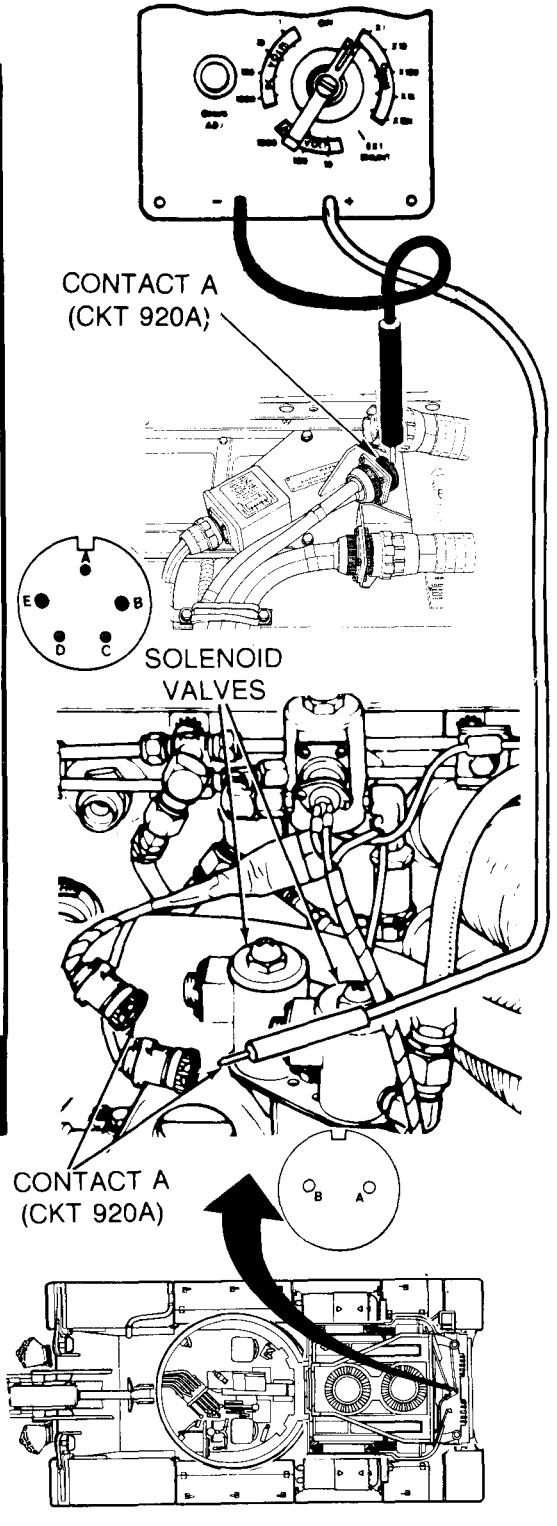
Does meter indicate continuity at both smoke generator engine harness connectors?

16

- **Repair smoke generator engine harness (page 10-298).**
- **If smoke generator engine harness cannot be repaired replace starter feed harness (page 10-274).**

NO

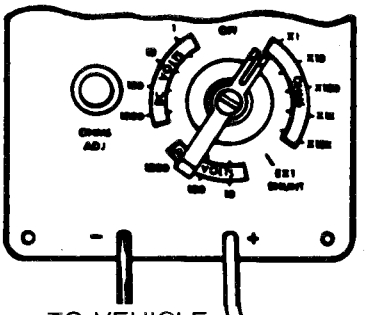
YES



TA250623

Symptom-77

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)



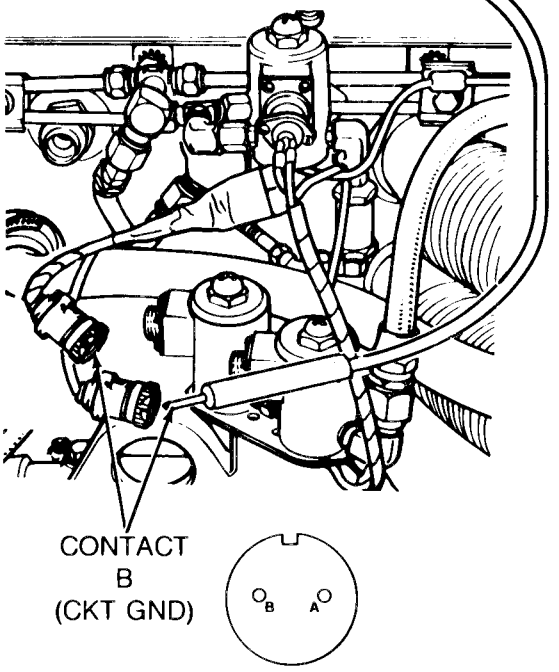
TO VEHICLE GROUND

17 **Check smoke generator engine harness (CKT GND) for continuity from both harness connectors at solenoid valves to ground.**

First Technician (Rear of Vehicle)

- Connect red probe of meter to contact B (CKT GND) of one smoke generator engine harness connector at solenoid valves and black probe to ground.
- Check if meter indicates continuity.
- Connect red probe of meter to contact B (CKT GND) of other smoke generator engine harness connector.
- Check if meter indicates continuity.

Does meter indicate continuity at both smoke generator engine harness connectors?



CONTACT B (CKT GND)

YES

18
- **Replace both smoke generator solenoid valves (page 21-25).**
- **Connect starter feed harness to starter motor harness.**

NO

19
- **Repair smoke generator engine harness (page 10-298).**
- **If smoke generator engine harness cannot be repaired replace starter feed harness (page 10-274).**
- **Connect starter feed harness to starter motor harness.**

TA250624

Symptom-77

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)

FROM STEP 2

20 Check for plugged, pinched, leaking or damaged fuel lines and fittings.

Second Technician (Operator's Station)

- Stop engine.

Both Technicians (Rear of Vehicle)

- Remove engine shroud (page 9-30).

Second Technician (Operator's Station)

- Start engine.

First Technician (Top Deck)

- Check fuel lines from smoke generator solenoids to front of engine for plugged, pinched, leaking or damaged lines or fittings.

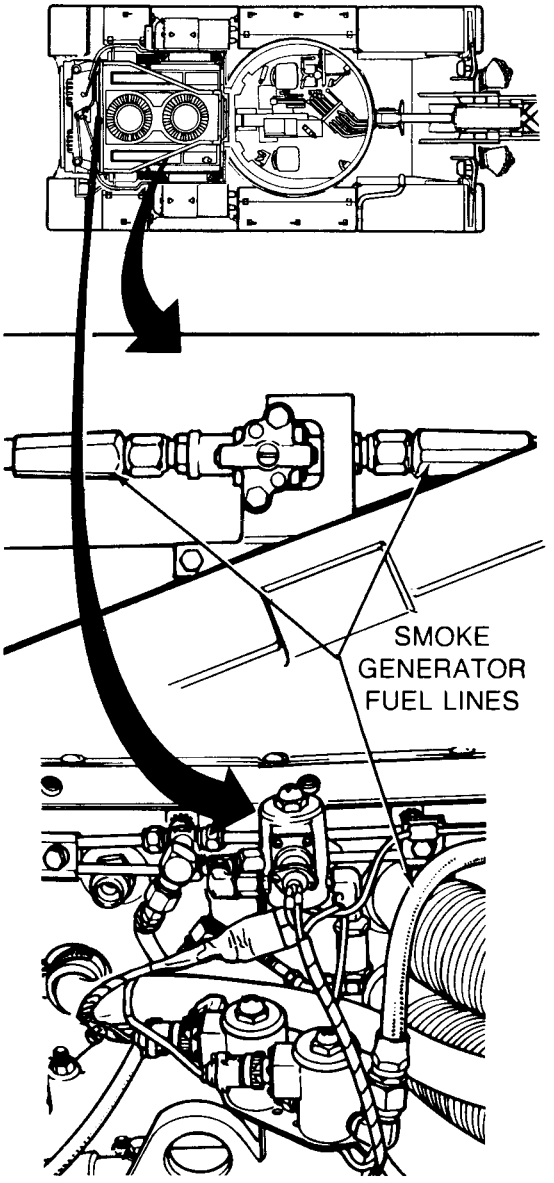
Are smoke generator fuel lines or fittings blocked, leaking or damaged?

NO

YES

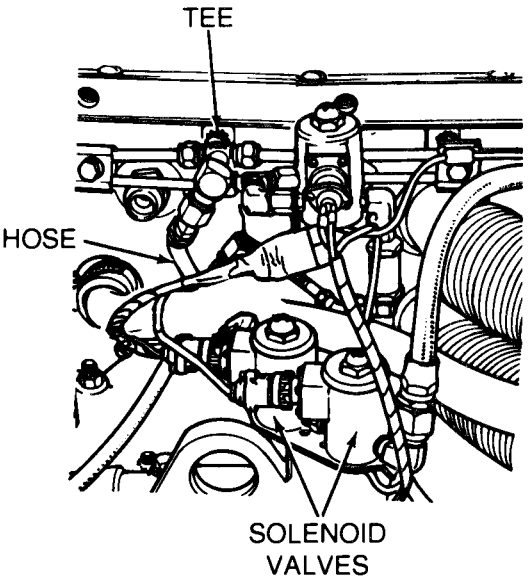
21

- **Tighten loose connections.**
- **Remove restrictions from lines or fittings.**
- **Replace damaged hoses (page 21-39).**



TA250625

Symptom-77 **DETAILED TROUBLESHOOTING PROCEDURE**
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)



22 **Check smoke generator hose from solenoid valves to tee for leaks or damage.**

Second Technician (Operator's Station)

- Set engine speed at 1600 RPM.
- Set SMOKE GENERATOR switch ON.

First Technician (Rear of Vehicle)

- Check for leaks or damage in hose from solenoid valves to tee.

Is output hose leaking or damaged?

NO

YES

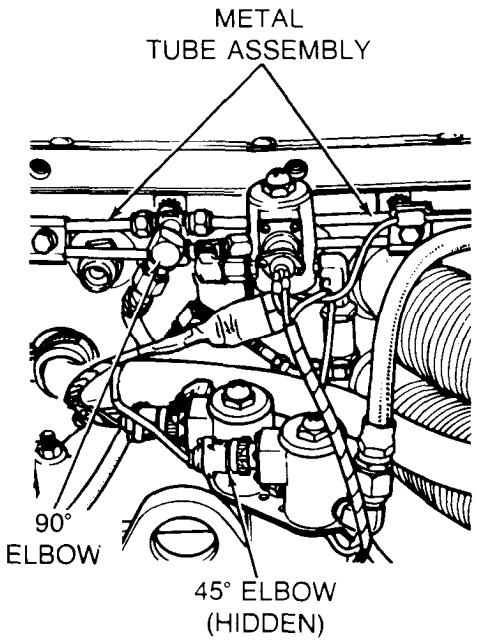
23

- **Tighten any loose fittings.**
- **Replace damaged hose (page 21-32).**

TA250626

Symptom-77

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GENERATOR
(Continued)



24 **Check if white smoke is reduced or missing in only one exhaust.**

First Technician (Side of Vehicle)

- Check amount of white smoke coming from each exhaust.

Is white smoke reduced or missing in only one exhaust?

YES

25

- **Remove tube assembly from defective side (page 21-34).**
- **If damaged, replace (page (page 21-34).**
- **If not damaged, run a small drill bit or stiff wire to exhaust end at tube to remove carbon or other restriction.**
- **Install tube assembly (page (page 21-37).**

NO

26

- **Remove tee, 90° elbow, hose and 45° elbow (page 21-30).**
- **Check tee and elbows for restriction.**
- **Remove restriction using a small drill bit or stiff wire.**
- **Replace damaged parts.**
- **Install tee, 90° elbow hose and 45° elbow.**

TA250627

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER

Symptom 78

GRENADE LAUNCHER FAILS TO FIRE

WARNING

To prevent injury to personnel, remove all live smoke grenades from launcher before start of troubleshooting (TM 5-5420-202-10).

CAUTION

To prevent equipment damage, turn off power before removing covers or harness connectors and before measuring continuity or resistance.

NOTE

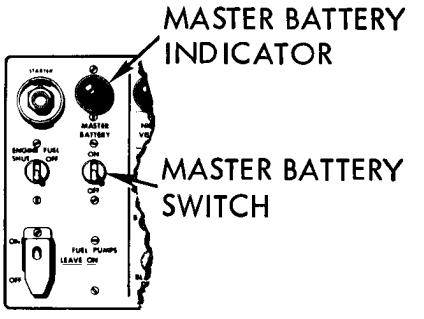
This procedure is to be performed by two persons. The lead person is referred to as the first technician and shall direct the activity of the second person called the second technician.

(1) **Check battery circuit.**

First Technician (Operator's station)

- Set MASTER BATTERY switch ON.
- Check if MASTER BATTERY indicator lights.

Does MASTER BATTERY indicator light?



YES

NO

(2) **See Symptom 28: No power in vehicle (master battery indicator lamp will not light).**

TA250657

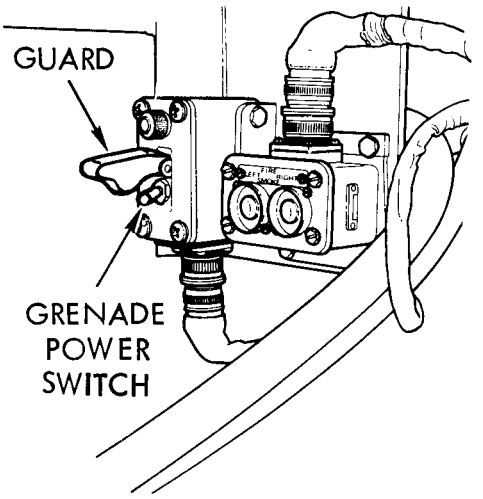
DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

Symptom 78

3 **Check GRENADE LAUNCHER circuit.**

- Lift guard over grenade power switch on power control box.
- Set GRENADE POWER switch ON.

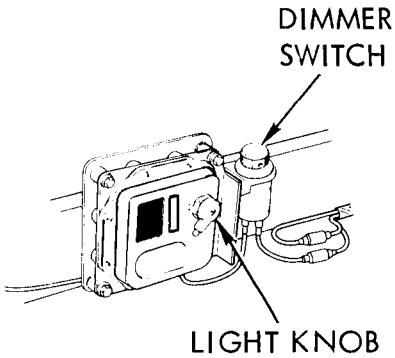
Does GRENADE POWER lamp light?



NO → 4 **Check commander's dome light for power.**

- Set GRENADE POWER switch on power control box OFF.
- Turn dimmer switch on commander's dome light fully clockwise.
- Press plunger on dome light knob and turn knob clockwise past stop. Release plunger.

Does white light light?



YES → 5

- **Check firing pins in right discharger barrels 1, 2, and 5 for electrical power.**
- **See step 16.**

NO → 6

- **Check socket A of harness connector at power control box for electrical power.**
- **See step 10.**

YES

TA250658

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

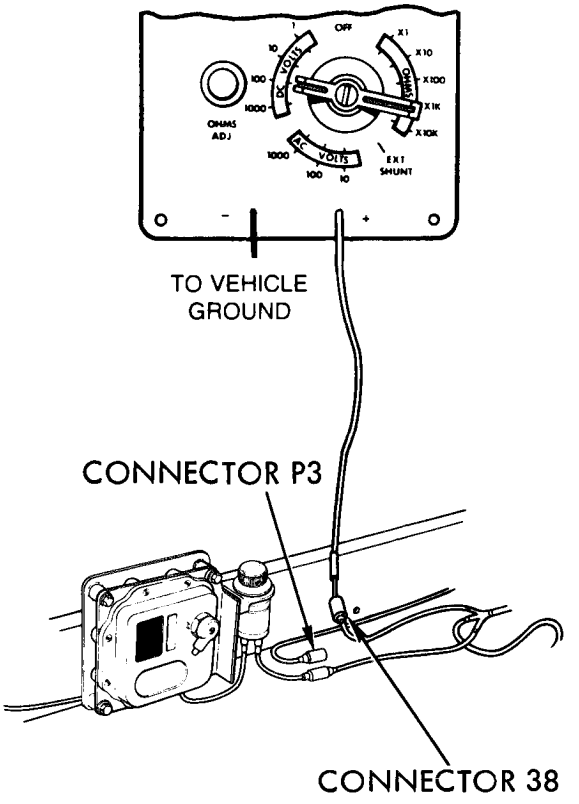
Symptom 78

7 Check connector 38 for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect harness connector 38 from harness connector P3.
- Set multimeter to measure 18 to 30 volts dc.
- Set MASTER BATTERY switch ON.
- Connect red probe of meter to center contact of connector 38 and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



YES

8 Connect harness connectors 38 and P3.

- Set MASTER BATTERY switch OFF.
- Connect harness connector 38 to harness connector P3.

NO

9

- **Check socket B of harness connector at master control panel for electrical power.**
- **See step 13.**

TA250659

Symptom 78

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

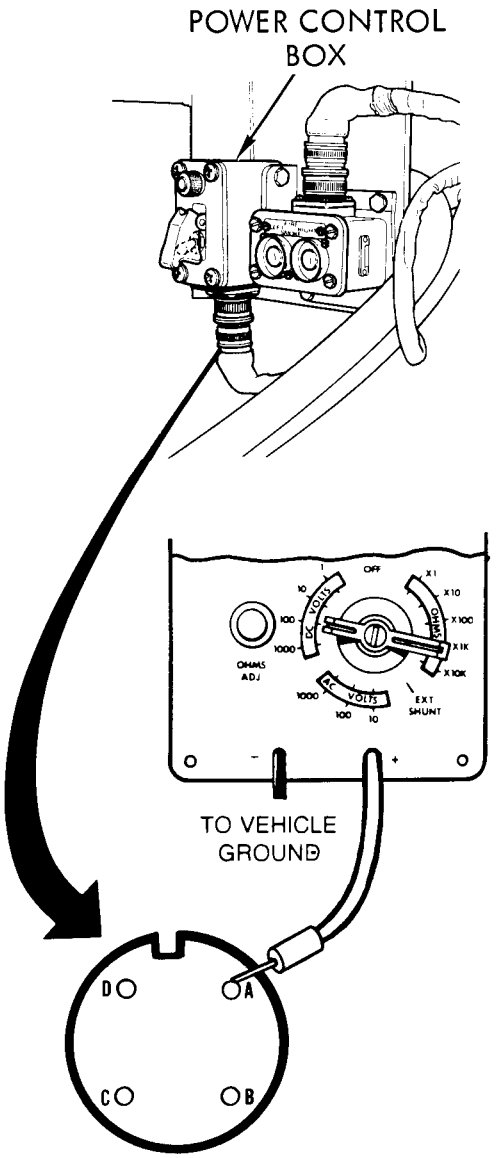
FROM STEP 6 OR 8

10 Check socket A of harness connector at power control box for electrical power.

First Technician (Operator's Station)

- Remove harness connector from power control box.
- Connect red probe of meter to socket A of harness connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



YES

11
- **Set MASTER BATTERY switch OFF.**
- **Replace smoke grenade power control box (page 22-2).**

NO

12
- **Set MASTER BATTERY switch OFF.**
- **Replace smoke grenade crew compartment wiring harness assembly (page 22-6).**

TA250660

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

Symptom 78

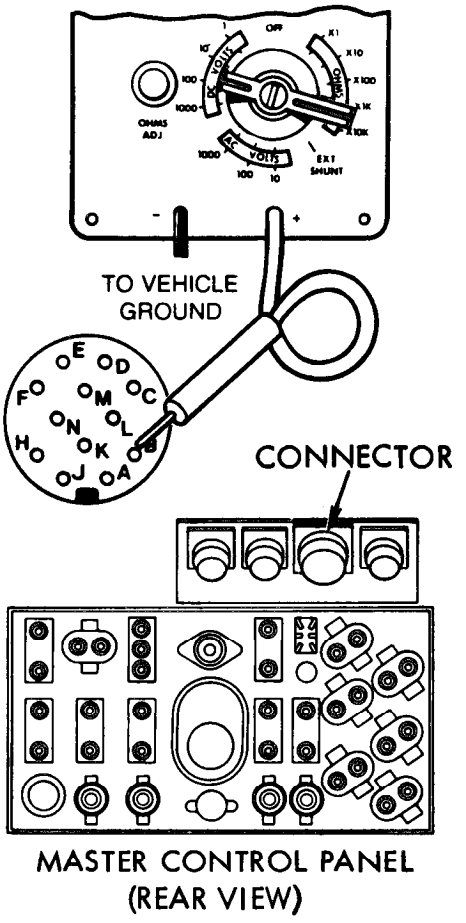
FROM STEP 9

13 **Check socket B of harness connector at master control panel for electrical power.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect harness from connector on master control panel.
- Connect red probe of meter to socket B of connector and black probe to ground.
- Set MASTER BATTERY switch ON.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



YES

14
- **Repair gas particulate blower and dome light wiring harness assembly (page 10-298).**

NO

15
- **Repair master control panel wiring harness (page 10-298).**

TA250661

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER (Continued)

Symptom 78

FROM STEP 5

16 Check firing pins in right discharger barrels 1, 2, and 5 for electrical power.

First Technician (Operator's Station)

- Press and hold LEFT button on pushbutton unit.

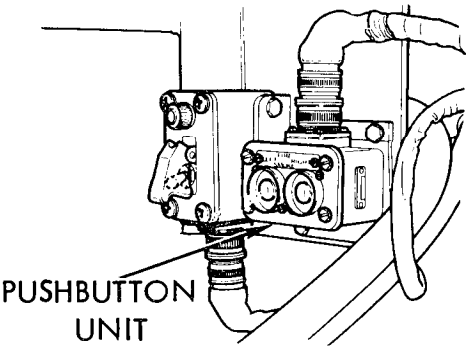
Second Technician (Right Discharger)

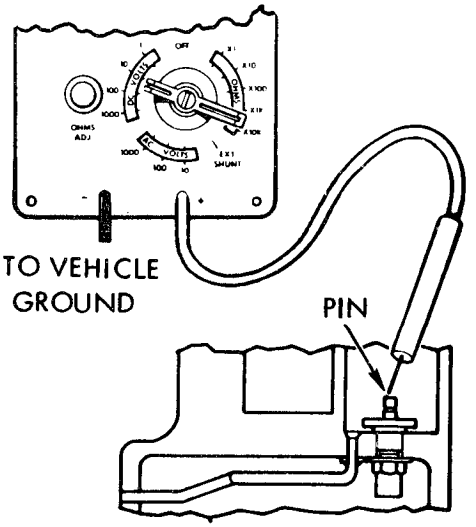
- Connect red probe of meter to pin in bottom of right discharger barrel 1, and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.
- Repeat above steps for discharger barrels 2 and 5 .

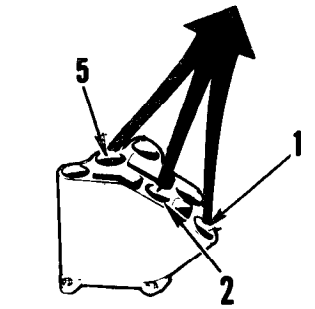
First Technician (Operator's Station)

- Release LEFT button on pushbutton unit.

Does meter indicate 18 to 30 volts dc at all three pins?







RIGHT DISCHARGER

17
- **Check firing pins in right discharger barrels 3, 4, and 6 for electrical power.**
- **See step 23.**

18 Check if any pin has electrical power.

Does meter indicate 18 to 30 volts dc at any pin?

NO — YES

19 Replace right smoke grenade discharger (page 22-23).

NO — YES

TA250662

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

Symptom 78

20 **Check socket C of harness connector at right discharger for electrical power.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Right Discharger)

- Disconnect harness connector from right discharger receptacle.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and hold LEFT button on pushbutton unit.

Second Technician (Right Discharger)

- Connect red probe of meter to socket C of harness connector and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

First Technician (Operator's Station)

- Release LEFT button on pushbutton unit.

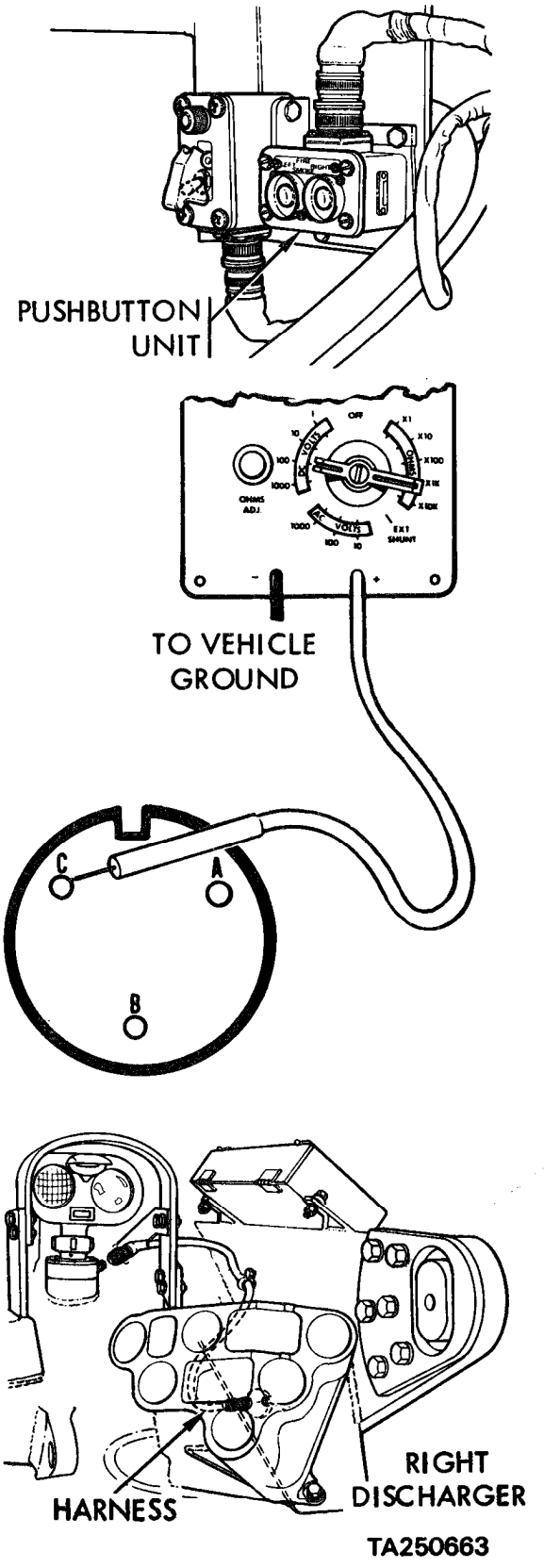
Does meter indicate 18 to 30 volts dc?

21
- **Check firing pin in left discharger barrel number 3 for electrical power.**
- **See step 44.**

NO

22 **Replace right smoke grenade discharger (page 22-23).**

YES



DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

Symptom 78

FROM STEP (17)

(23) Check firing pins in right discharger barrels 3, 4, and 6 for electrical power.

First Technician (Operator's Station)

- Press and hold RIGHT button on pushbutton unit.

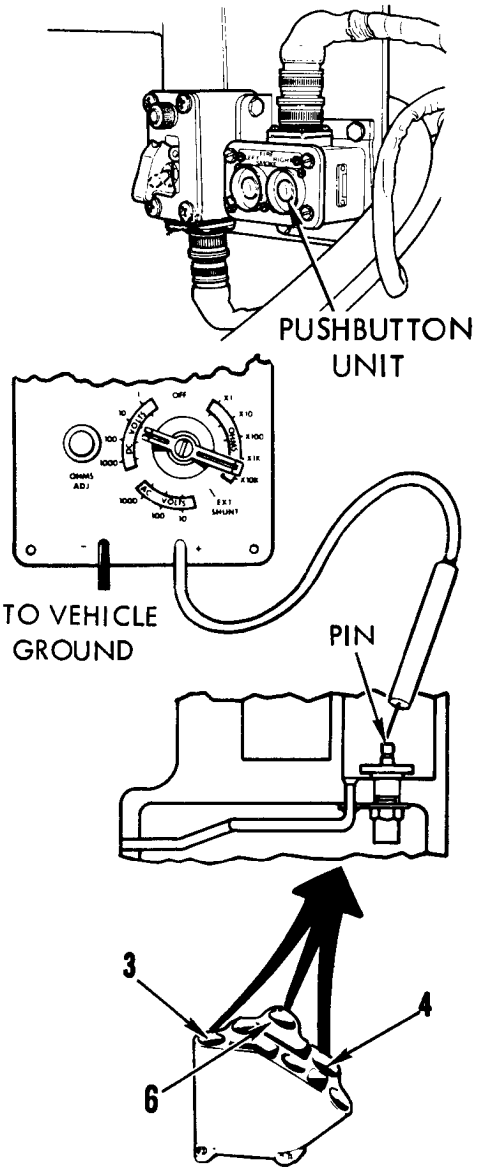
Second Technician (Right Discharger)

- Connect red probe of meter to pin in bottom of right discharger barrel 3, and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.
- Repeat above steps for discharger barrels 4 and 6.

First Technician (Operator's Station)

- Release RIGHT button on pushbutton unit.

Does meter indicate 18 to 30 volts dc at all three pins?



(25) Check if any pin has electrical power.

Does meter indicate 18 to 30 volts dc at any pin?

NO → **(26) Replace right smoke grenade discharger (page 22-23).**

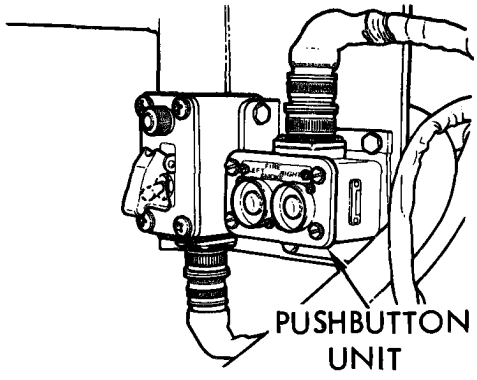
YES → **(24)**

- **Check firing pins in left discharger barrels 3, 4, and 6 for electrical power.**
- **See step 30.**

TA250664

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

Symptom 78



27 **Check socket A of harness connector at right discharger for electrical power.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Right Discharger)

- Disconnect harness connector from right discharger receptacle.

First Technician (Operator's Station)

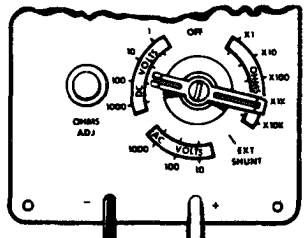
- Set MASTER BATTERY switch ON.
- Press and hold RIGHT button on pushbutton unit.

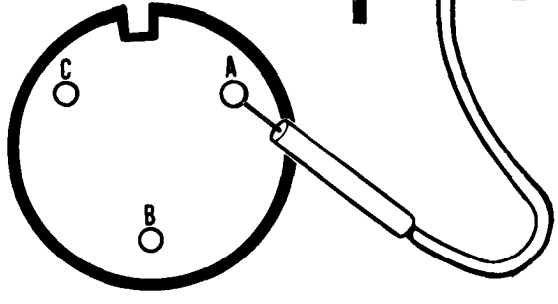
Second Technician (Right Discharger)

- Connect red probe of meter to socket A of harness connector and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

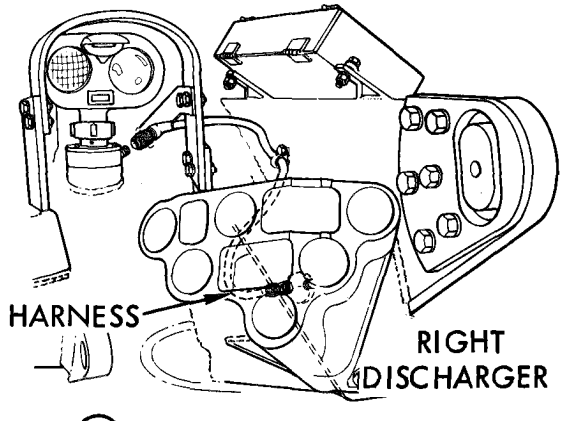
First Technician (Operator's Station)

- Release RIGHT button on pushbutton unit.





Does meter indicate 18 to 30 volts dc?



NO

28
- **Check firing pin in left discharger barrel number 1 for electrical power.**
- **See step 58.**

YES

29
- **Set GRENADE POWER switch OFF.**
- **Set MASTER BATTERY switch OFF.**
- **Replace right smoke grenade discharger (page 22-23).**

TA250665

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

Symptom 78

FROM STEP (24)

(30) Check firing pins in left discharger barrels 3, 4, and 6 for electrical power.

First Technician (Operator's Station)

- Press and hold LEFT button on pushbutton unit.

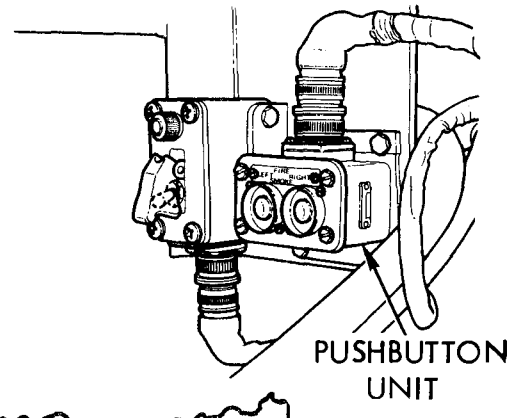
Second Technician (Left Discharger)

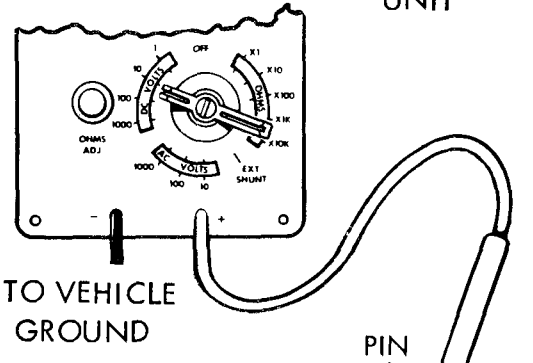
- Connect red probe of meter to pin in bottom of left discharger barrel 3, and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.
- Repeat above steps for discharger barrels 4 and 6.

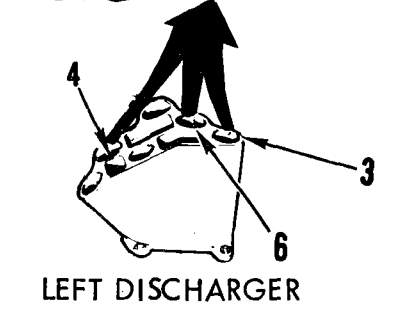
First Technician (Operator's Station)

- Release LEFT button on pushbutton unit.

Does meter indicate 18 to 30 volts dc at all three pins?







(31)
- **Check if any pin has electrical power.**
- **Does meter indicate 18 to 30 volts dc at any pin?**

NO / YES

(32)
- **Check firing pins in left discharger barrels 1, 2, and 5 for electrical power.**
- **See step 37.**

NO / YES

(33) Replace left smoke grenade discharger (page 22-23).

TA250666

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

Symptom 78

34 Check socket A of harness connector at left discharger for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Left Discharger)

- Disconnect harness connector from left discharger receptacle.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and hold LEFT button on pushbutton unit.

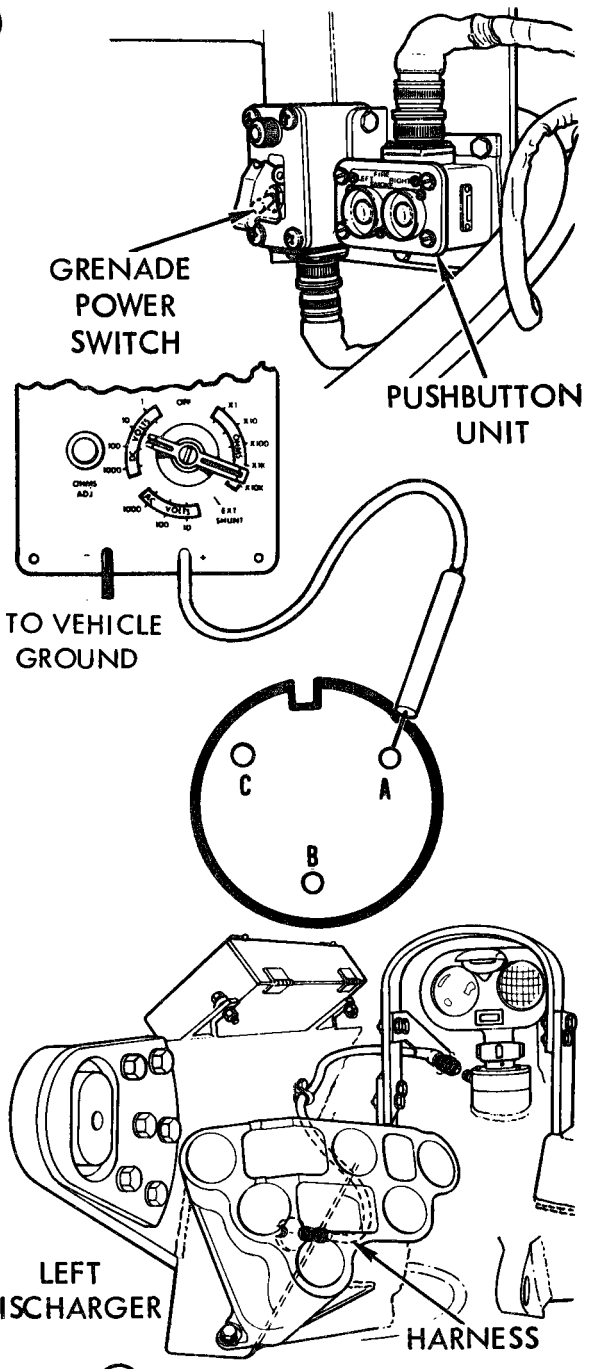
Second Technician (Left Discharger)

- Connect red probe of meter to socket A of harness connector and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

First Technician (Operator's Station)

- Release LEFT button on pushbutton unit.

Does meter indicate 18 to 30 volts dc?



NO

35
- **Check electrical harness for continuity.**
- **See step 72.**

YES

36
- **Set GRENADE POWER switch OFF.**
- **Set MASTER BATTERY switch OFF.**
- **Replace left smoke grenade discharger (page 22-23).**

TA250667

Symptom 78 **DETAILED TROUBLESHOOTING PROCEDURE**
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

FROM STEP 32

37 **Check firing pins in left discharger barrels 1, 2, and 5 for electrical power.**

First Technician (Operator's Station)

- Press and hold RIGHT button on pushbutton unit.

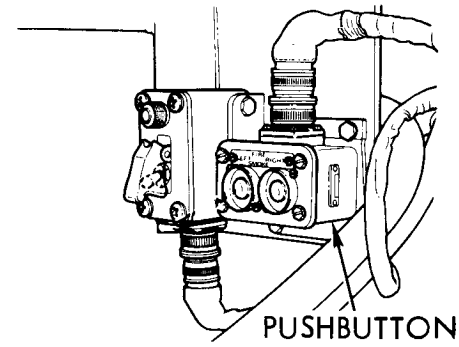
Second Technician (Left Discharger)

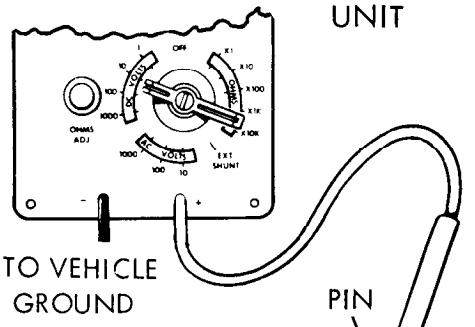
- Connect red probe of meter to pin in bottom of left discharger barrel 1, and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.
- Repeat above steps for discharger barrels 2 and 5.

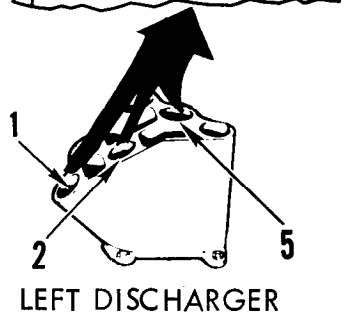
First Technician (Operator's Station)

- Release RIGHT button on pushbutton unit.

Does meter indicate 18 to 30 volts dc at all three pins?







LEFT DISCHARGER

NO → **38**
- **Check if any pin has electrical power.**
- **Does meter indicate 18 to 30 volts dc at any pin?**

NO → **40** **Replace left smoke grenade discharger (page 22-23).**

YES → **39**
- **Return grenade launcher to service.**
- Set GRENADE POWER switch on power control box OFF.
- Set MASTER BATTERY switch OFF.

Notify your supervisor.

TA250668

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

Symptom 78

41 **Check socket C of harness connector at left discharger for electrical power.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.

Second Technician (Left Discharger)

- Disconnect harness connector from left discharger receptacle.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Press and hold RIGHT button on pushbutton unit.

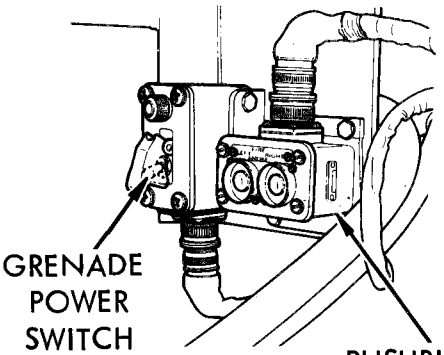
Second Technician (Left Discharger)

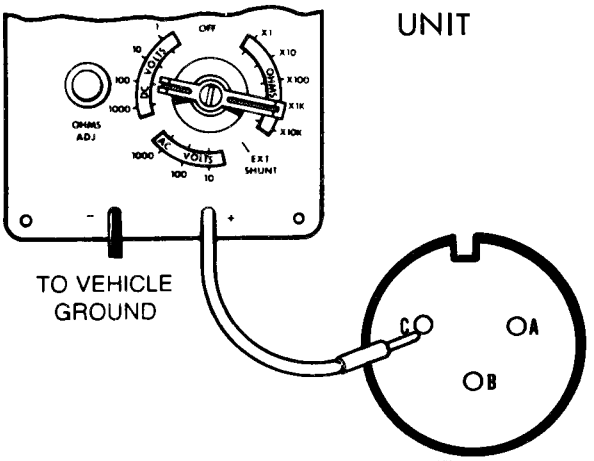
- Connect red probe of meter to socket C of harness connector and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

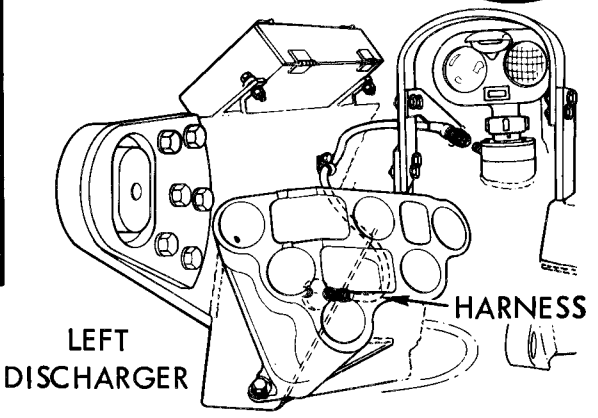
First Technician (Operator's Station)

- Release RIGHT button on pushbutton unit.

Does meter indicate 18 to 30 volts dc?







NO

42
- **Check harness for continuity between socket C of connector at left discharger and socket D of connector at pushbutton unit.**
- **See step 79.**

YES

43
- **Set GRENADE POWER switch OFF.**
- **Set MASTER BATTERY switch OFF.**
- **Replace left smoke grenade discharger (page 22-23).**

TA250670

DETAILED TROUBLESHOOTING PROCEDURE

Symptom 78 **SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER**

FROM STEP **(Continued)**

21

44 **Check firing pin in left discharger barrel number 3 for electrical power.**

First Technician (Operator's Station)

- Press and hold LEFT button on pushbutton unit.

Second Technician (Left Discharger)

- Connect red probe of meter to pin in bottom of left discharger barrel number 3.
- Check if meter indicates 18 to 30 volts dc.

First Technician (Operator's Station)

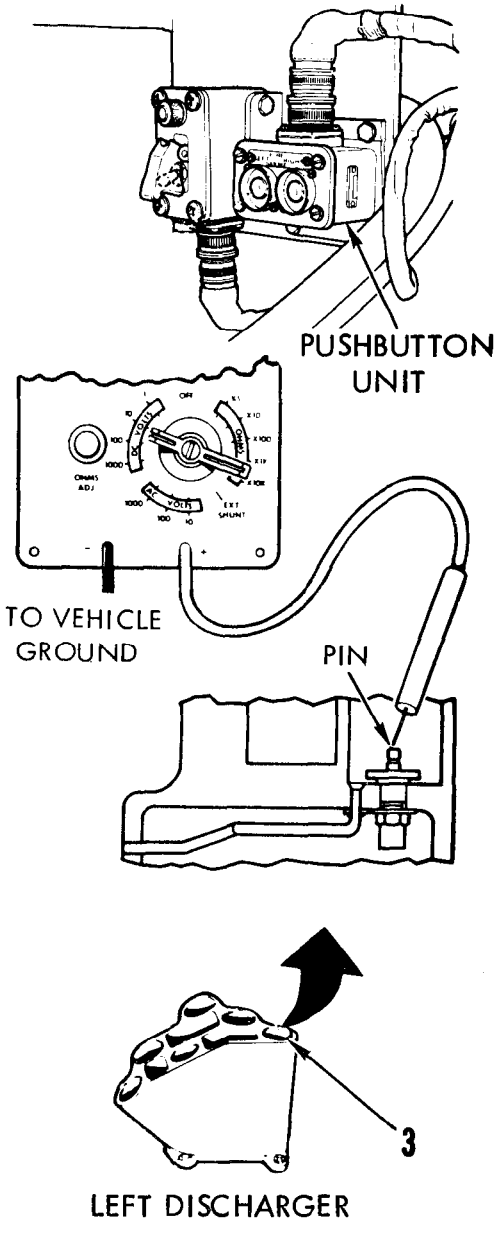
- Release LEFT button on pushbutton unit.

Does meter indicate 18 to 30 volts dc?

45
- **Check socket F of harness connector at pushbutton unit for electrical power.**
- **See step 53.**

NO

YES



TA250669

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

Symptom 78

46 **Check harness for continuity between socket C of connector at right discharger and socket A of connector at pushbutton unit.**

First Technician (Operator's Station)

- Set GRENADE POWER switch OFF.
- Set MASTER BATTERY switch OFF.
- Remove harness connector from pushbutton unit.
- Set multimeter to OHMS XI scale and zero meter.
- Connect black probe of meter to socket A of harness connector at pushbutton unit.

Second Technician (Right Discharger)

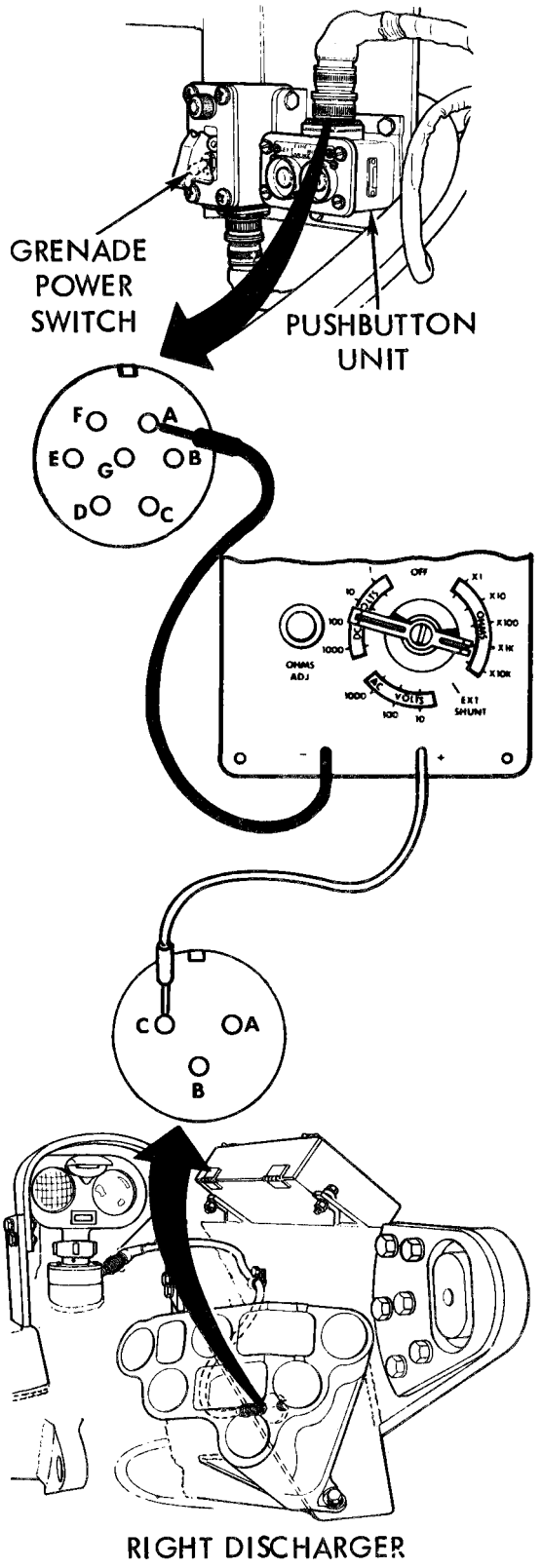
- Connect red probe of meter to socket C of harness connector at right discharger.
- Check if meter indicates continuity.

Does meter indicate continuity?

YES

47
- **Connect harness connector to jack on right discharger.**
- **Replace smoke grenade pushbutton unit (page 22-4).**

NO



TA250671

Symptom 78

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

48 **Check for continuity between socket C of harness connector at right discharger and pin C of harness connector at headlight assembly.**

Second Technician (Headlight Assembly)

- Disconnect harness connector from receptacle on headlight assembly mount.
- Connect red probe of meter to socket C of connector at right discharger.
- Connect black probe of meter to pin C of harness connector at headlight assembly.
- Check if meter indicates continuity.

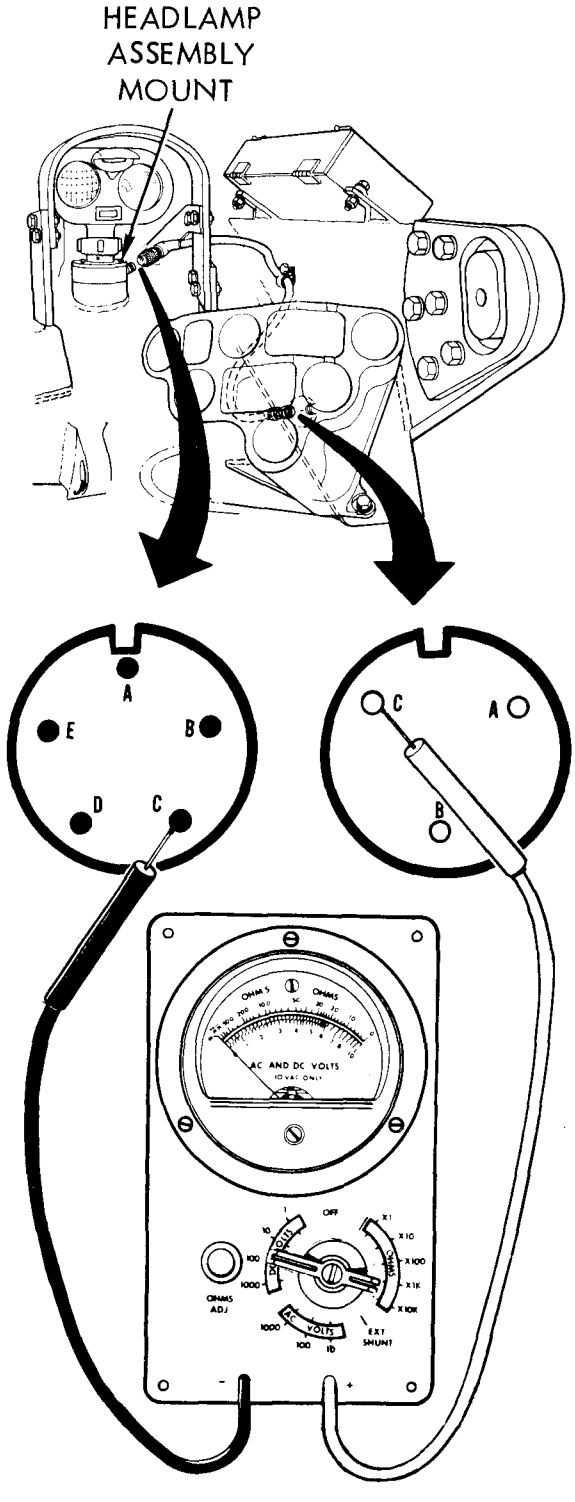
Does meter indicate continuity?

49

- **Connect harness connector to jack on push-button unit.**
- **Replace wiring harness 12291322.**

NO

YES



TA250672

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

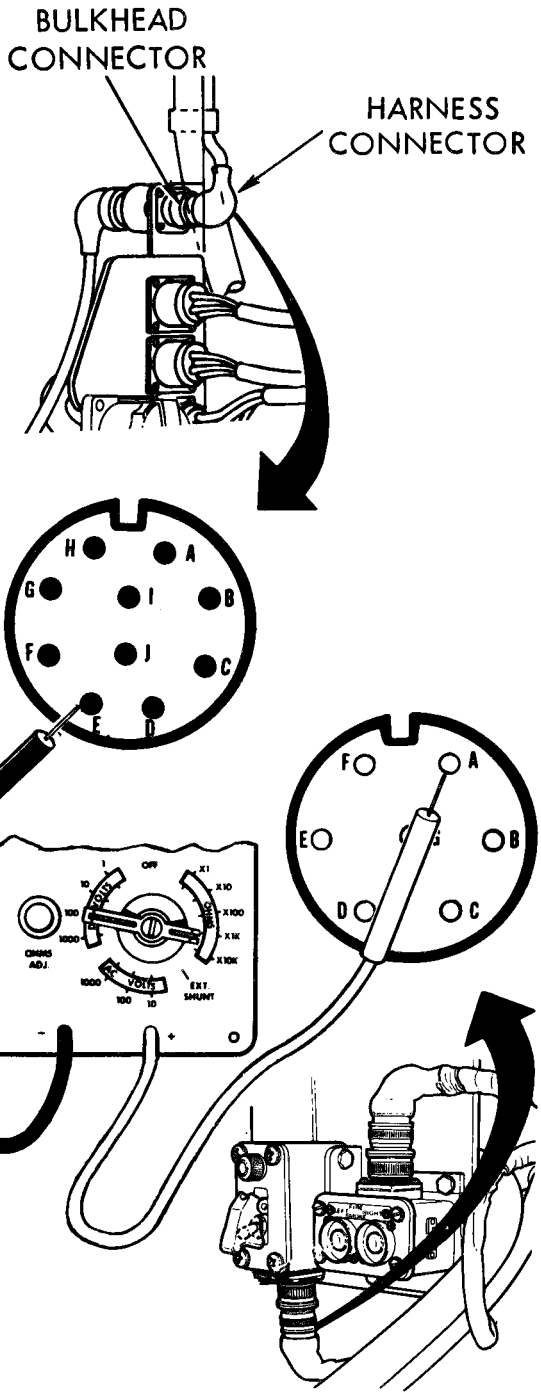
Symptom 78

50 **Check harness for continuity between socket A at pushbutton unit and pin E of bulkhead connector.**

First Technician (Operator's Station)

- Disconnect harness connector from bulkhead connector.
- Connect red probe of meter to socket A of harness connector at pushbutton unit.
- Connect black probe of meter to pin E of bulkhead connector.
- Check if meter indicates continuity.

Does meter indicate continuity?



YES → **51** **Replace smoke grenade hull compartment wiring harness assembly (page 22-12).**

NO → **52** **Replace smoke grenade crew compartment wiring harness assembly (page 22-6).**

TA250673

DETAILED TROUBLESHOOTING PROCEDURE

Symptom 78 SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER

FROM STEP (Continued)

45

53 **Check socket F of harness connector at pushbutton unit for electrical power.**

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect harness connector from pushbutton unit.

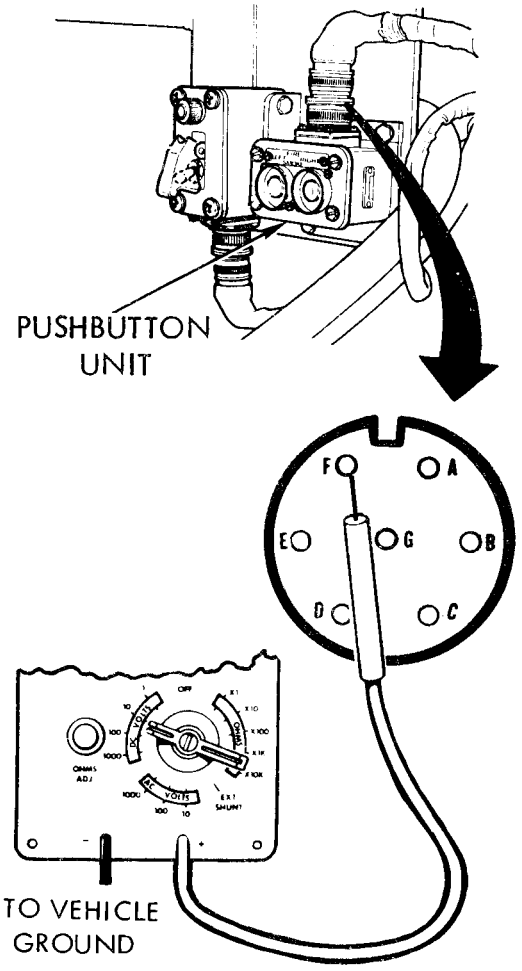
Second Technician (Right Discharger)

- Connect harness connector to right discharger receptacle.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Set multimeter to measure 18 to 30 volts dc.
- Connect red probe of meter to socket F of harness connector at pushbutton unit, and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?

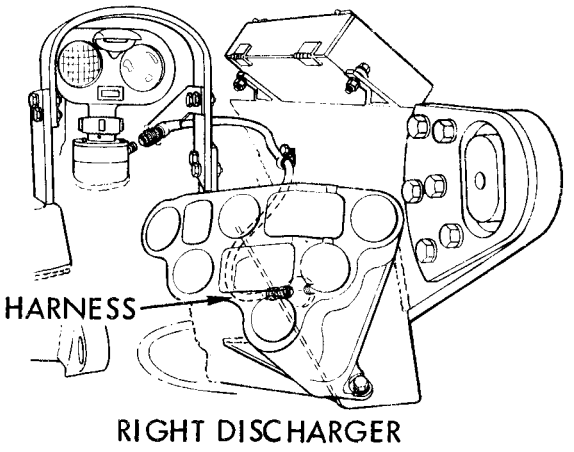


YES

54

- **Set GRENADE POWER switch OFF.**
- **Set MASTER BATTERY switch OFF.**
- **Replace smoke grenade pushbutton unit (page 22-4).**

NO



TA250674

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

Symptom 78

55 **Check harness for continuity between socket F of connector at pushbutton unit and socket D of connector at grenade control box**

First Technician (Operator's Station)

- Set GRENADE POWER switch OFF.
- Set MASTER BATTERY switch OFF.
- Disconnect harness connector from grenade power control box.
- Set multimeter to OHMS XI scale and zero meter.
- Connect red probe of meter to socket F of harness connector at pushbutton unit.
- Connect black probe of meter to socket D of harness connector at grenade power control box.
- Check if meter indicates continuity.

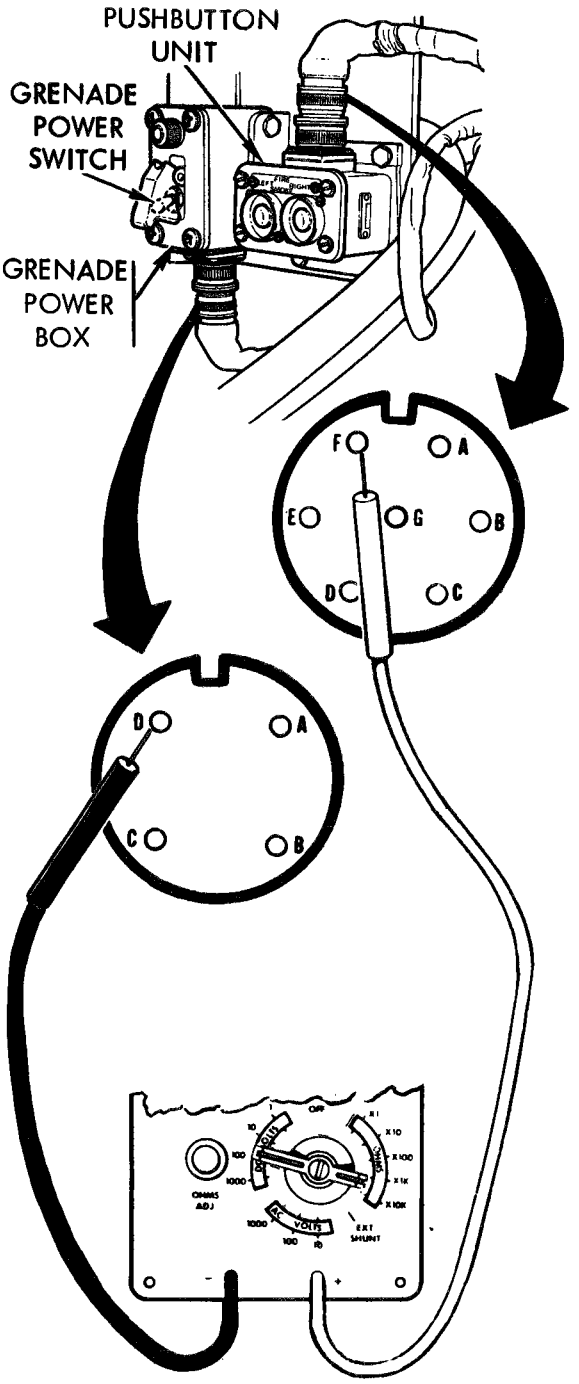
Does meter indicate continuity?

YES

56
- **Connect harness connector to pushbutton unit.**
- **Replace smoke grenade power control box (page 22-2).**

NO

57 **Replace smoke grenade crew compartment wiring harness assembly (page 22-6).**



TA250675

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

Symptom 78

FROM STEP 28

58 Check firing pin in left discharger barrel number 1 for electrical power.

First Technician (Operator's Station)

- Press and hold RIGHT button on pushbutton unit.

Second Technician (Left Discharger)

- Connect red probe of meter to pin in bottom of left discharger barrel number 1.
- Check if meter indicates 18 to 30 volts dc.

First Technician (Operator's Station)

- Release RIGHT button on pushbutton unit.

Does meter indicate 18 to 30 volts dc?

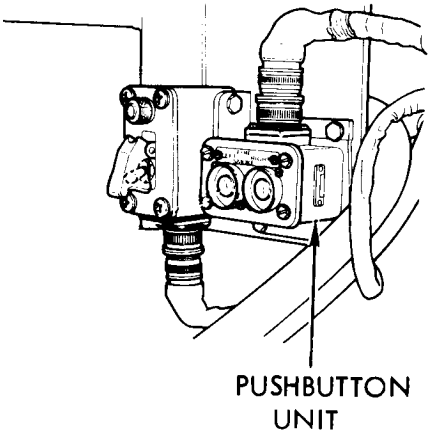
59

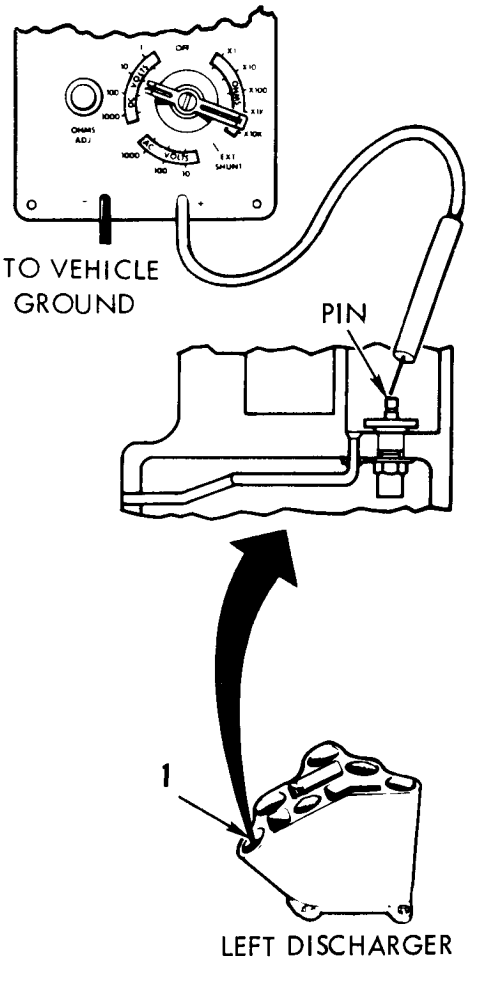
- **Check socket C of harness connector at pushbutton unit for electrical power.**

NO

- **See step 67.**

YES





TA250676

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

Symptom 78

(60) **Check harness for continuity between socket A of connector at right discharger and socket B of connector at pushbutton unit.**

First Technician (Operator's Station)

- Set GRENADE POWER switch OFF.
- Set MASTER BATTERY switch OFF.
- Disconnect harness connector from pushbutton unit.
- Set multimeter to OHMS XI scale and zero meter.
- Connect black probe of meter to socket B of harness connector at pushbutton unit.

Second Technician (Right Discharger)

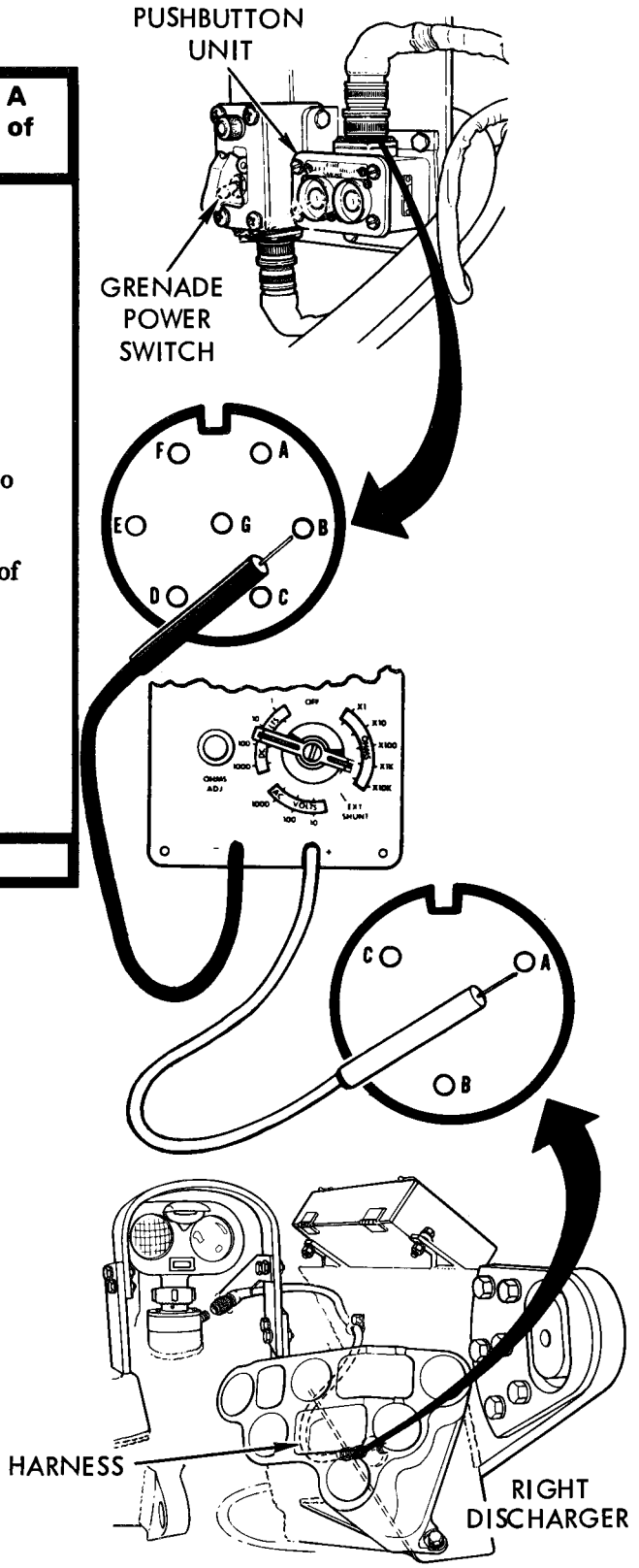
- Connect red probe of meter to socket A of harness connector at right discharger.
- Check if meter indicates continuity.

Does meter indicate continuity?

(61)
- **Connect harness connector to receptacle on right discharger.**
- **Replace smoke grenade pushbutton unit (page 22-4).**

YES

NO



TA250677

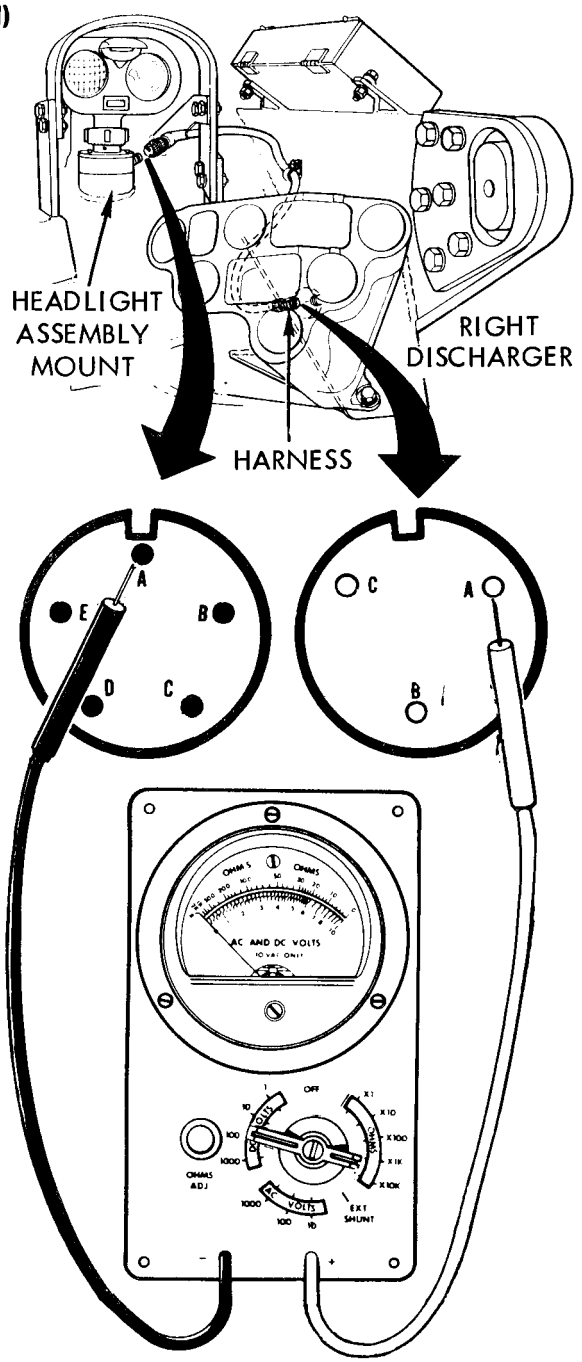
DETAILED TROUBLESHOOTING PROCEDURE
Symptom 78 **SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER (Continued)**

62 **Check for continuity between socket A of harness connector at right discharger and pin A of harness connector at headlight assembly.**

Second Technician (Headlight Assembly)

- Disconnect harness connector from jack on headlight assembly mount.
- Connect red probe of meter to socket A of harness connector at right discharger.
- Connect black probe of meter to pin A of harness connector at headlight assembly.
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

NO

63
- **Connect harness connector to jack on push-button unit.**
- **Replace wiring harness 12291322.**

TA250678

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

Symptom 78

64 **Check harness for continuity between socket B at pushbutton unit and pin F of bulkhead connector.**

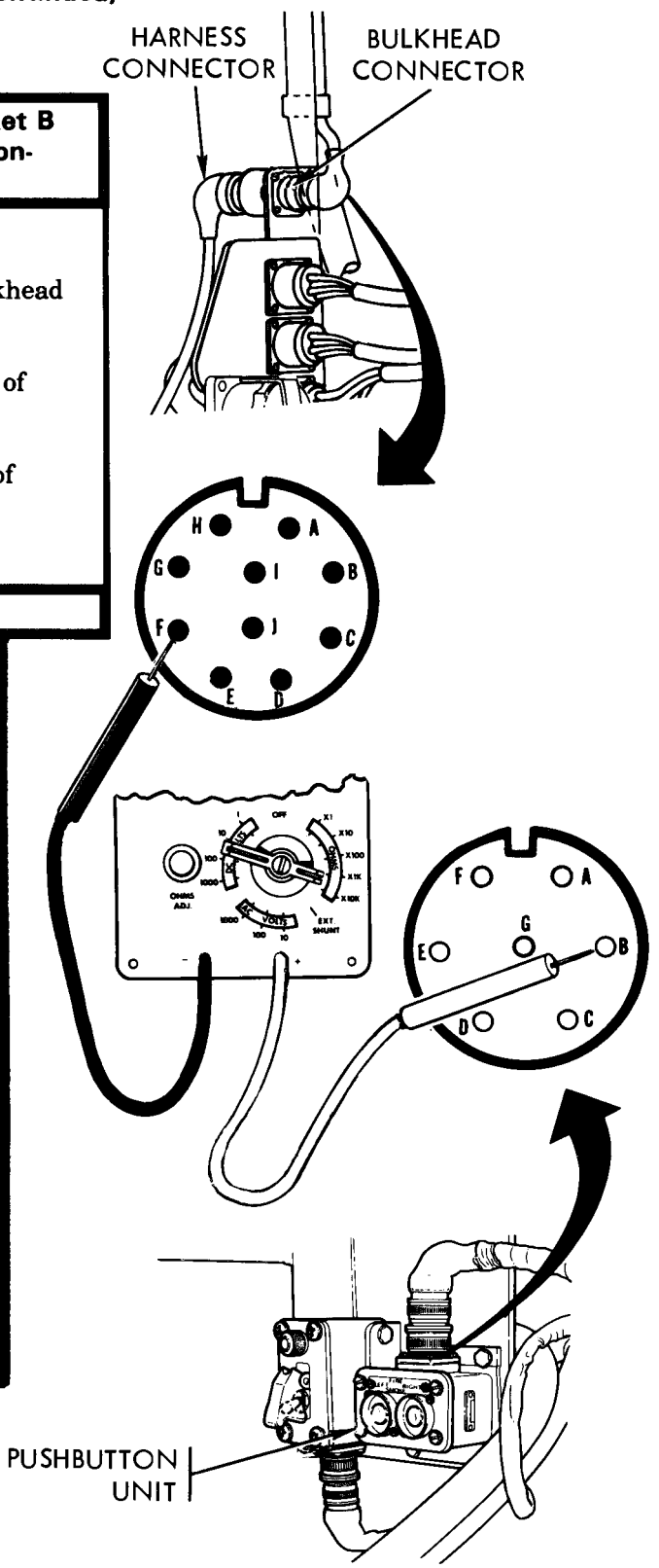
First Technician (Operator's Station)

- Disconnect harness connector from bulkhead connector.
- Connect red probe of meter to socket B of harness connector at pushbutton unit.
- Connect black probe of meter to pin F of bulkhead connector.
- Check if meter indicates continuity.

Does meter indicate continuity?

65 **Replace smoke grenade hull compartment wiring harness assembly (page 22-12).** YES

66 **Replace smoke grenade crew compartment wiring harness assembly (page 22-6).** NO



TA250679

Symptom 78

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

FROM STEP 59

67 Check socket C of harness connector at pushbutton unit for electrical power.

First Technician (Operator's Station)

- Set MASTER BATTERY switch OFF.
- Disconnect harness connector from pushbutton unit.

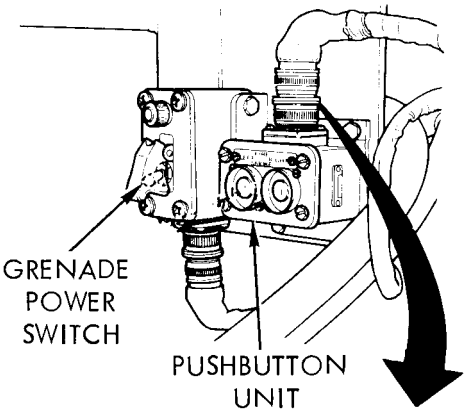
Second Technician (Right Discharger)

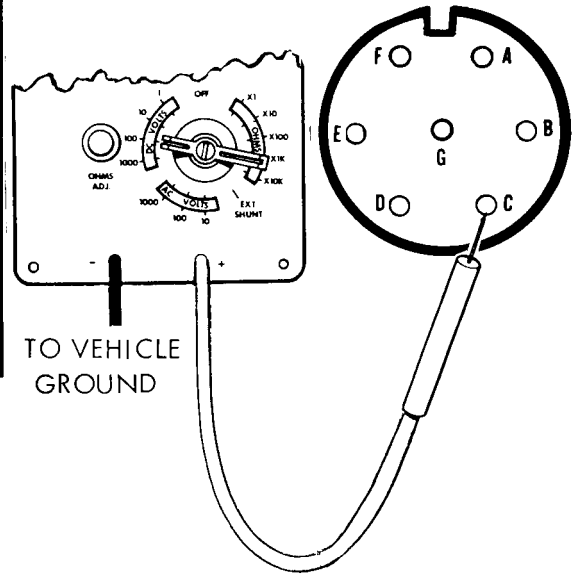
- Connect harness connector to right discharger receptacle.

First Technician (Operator's Station)

- Set MASTER BATTERY switch ON.
- Connect red probe of meter to socket C of harness connector at pushbutton unit and black probe to ground.
- Check if meter indicates 18 to 30 volts dc.

Does meter indicate 18 to 30 volts dc?



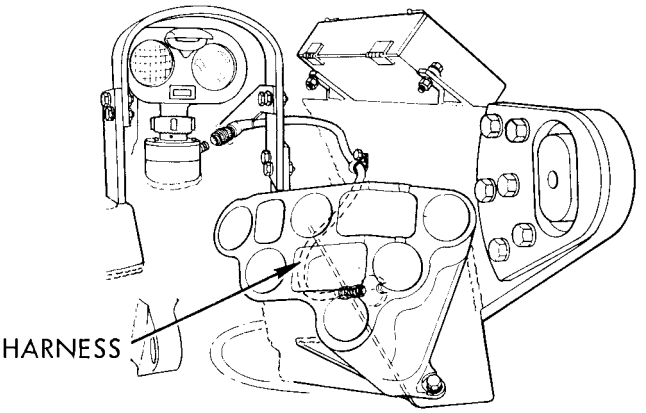


YES

68

- **Set GRENADE POWER switch OFF.**
- **Set MASTER BATTERY switch OFF.**
- **Replace smoke grenade pushbutton unit (page 22-4).**

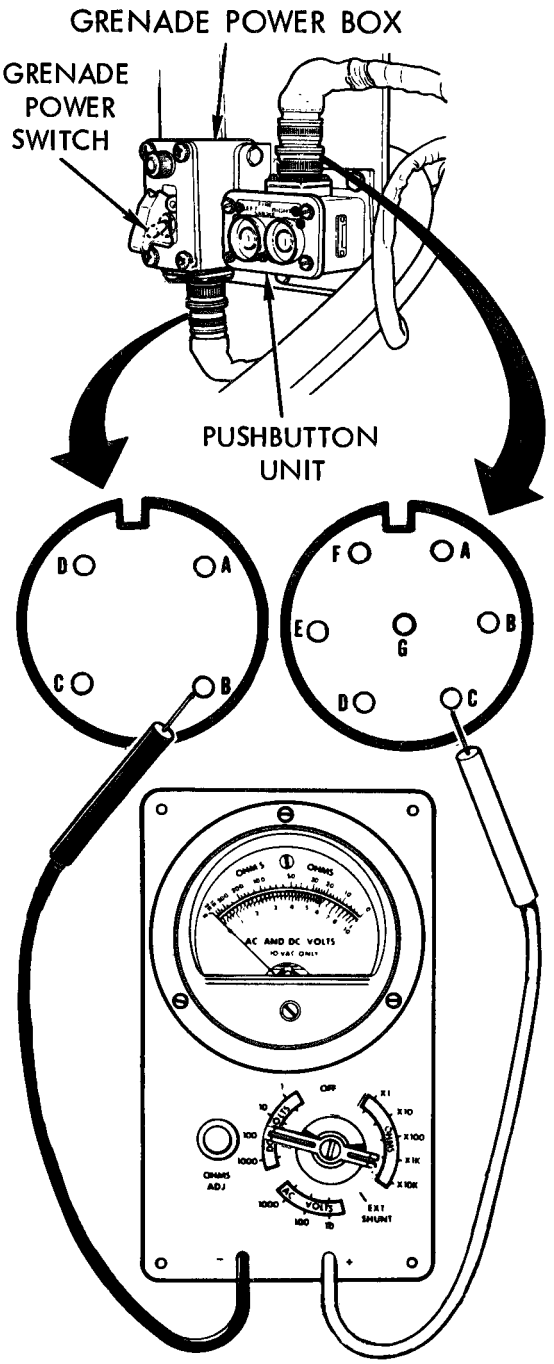
NO



TA250680

Symptom 78

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)



69 **Check harness for continuity between socket C of connector at pushbutton unit and socket B of connector at grenade power box.**

First Technician (Operator's Station)

- Set GRENADE POWER switch OFF.
- Set MASTER BATTERY switch OFF.
- Disconnect harness connector from grenade power box.
- Set multimeter to OHMS XI scale and zero meter.
- Connect red probe of meter to socket C of harness connector at pushbutton unit.
- Connect black probe of meter to socket B of harness connector at grenade power box.
- Check if meter indicates continuity.

Does meter indicate continuity?

YES

70
- **Connect harness connector to pushbutton unit.**
- **Replace smoke grenade power control box (page 22-2).**

NO

71 **Replace smoke grenade crew compartment wiring harness assembly (page 22-6).**

TA250681

DETAILED TROUBLESHOOTING PROCEDURE

Symptom 78 SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER (Continued)

FROM STEP 35

72 **Check harness for continuity between socket A of connector at left discharger and socket E of connector at pushbutton unit.**

First Technician (Operator's Station)

- Set GRENADE POWER switch OFF.
- Set MASTER BATTERY switch OFF.
- Remove harness connector from pushbutton unit.
- Set multimeter to OHMS XI scale and zero meter.
- Connect black probe of meter to socket E of harness connector at pushbutton unit.

Second Technician (Left Discharger)

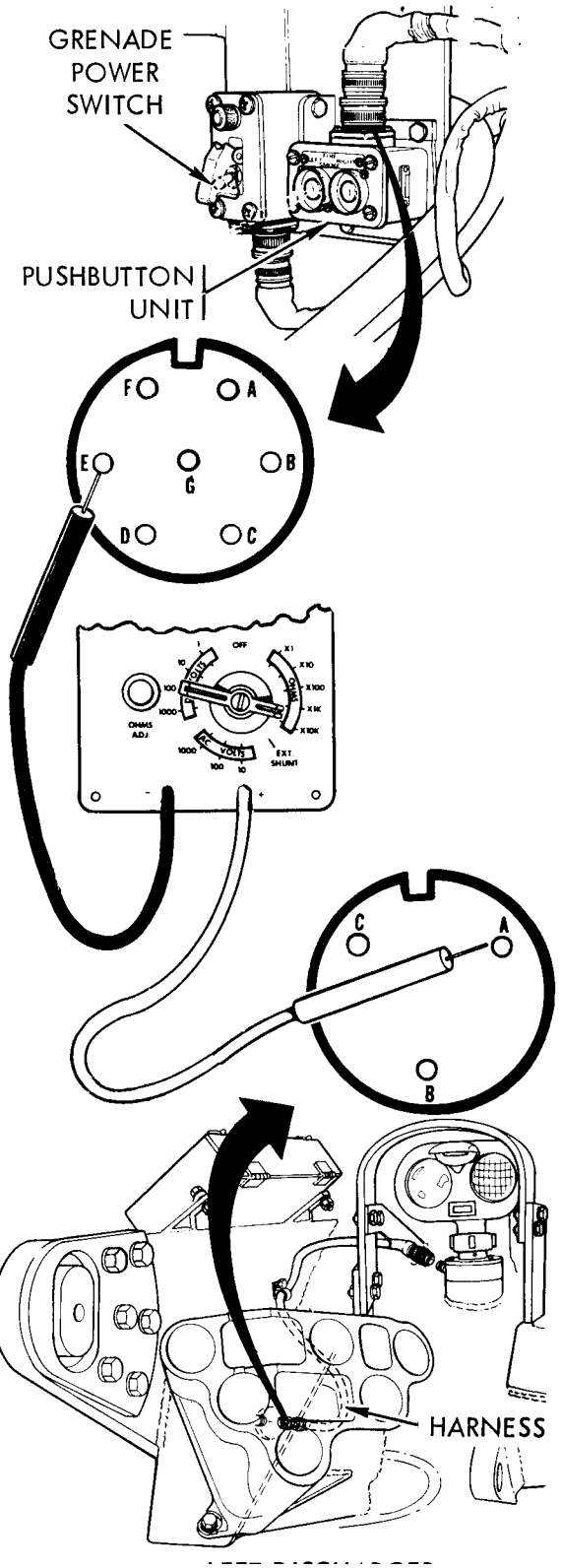
- Connect red probe of meter to socket A of harness connector at left discharger.
- Check if meter indicates continuity.

Does meter indicate continuity?

YES

73
- **Connect harness connector to jack on left discharger**
- **Replace smoke grenade pushbutton unit (page 22-4).**

NO



TA250682

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

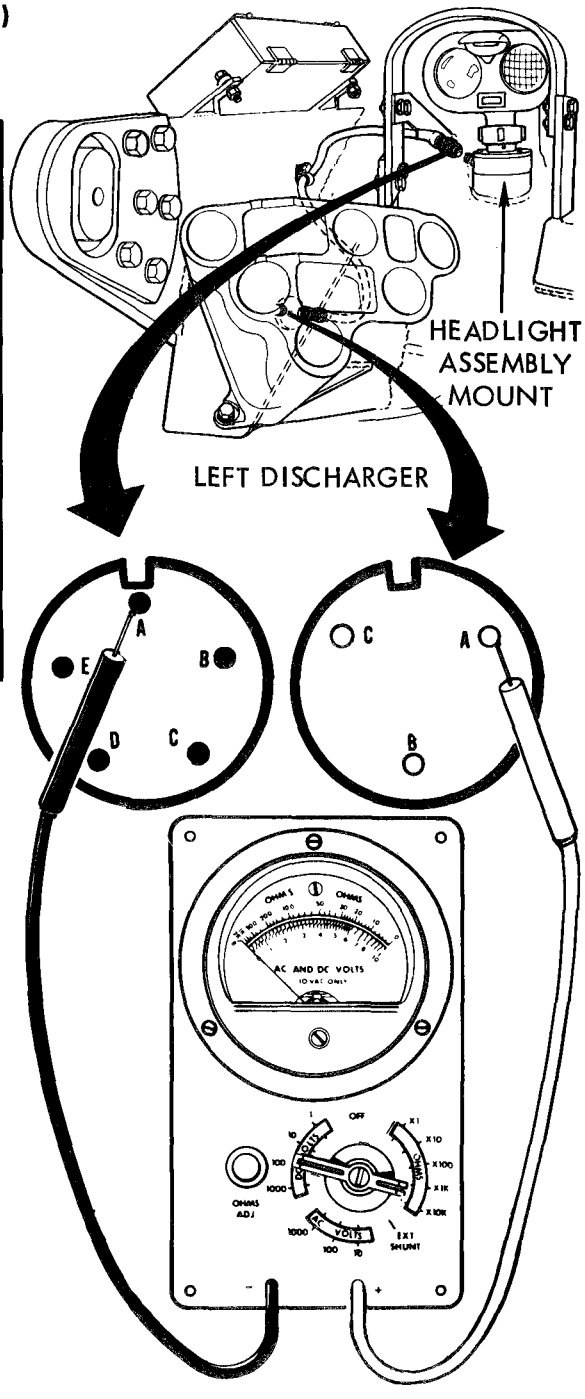
Symptom 78

74 **Check for continuity between socket A of harness connector at left discharger and pin A of harness connector at headlight assembly.**

Second Technician (Headlight Assembly)

- Disconnect harness connector from headlight assembly mount.
- Connect red probe of meter to socket A of connector at left discharger.
- Connect black probe of meter to pin A of harness connector at headlight assembly.
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

NO

75
- **Connect harness connector to jack on push-button unit.**
- **Replace wiring harness 12291327.**

TA250683

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

Symptom 78

76 **Check harness for continuity between socket E at pushbutton unit and pin B of bulkhead connector.**

First Technician (Operator's Station)

- Disconnect harness connector from bulkhead connector.
- Connect red probe of meter to socket E of harness connector at pushbutton unit.
- Connect black probe of meter to pin B of bulkhead connector.
- Check if meter indicates continuity.

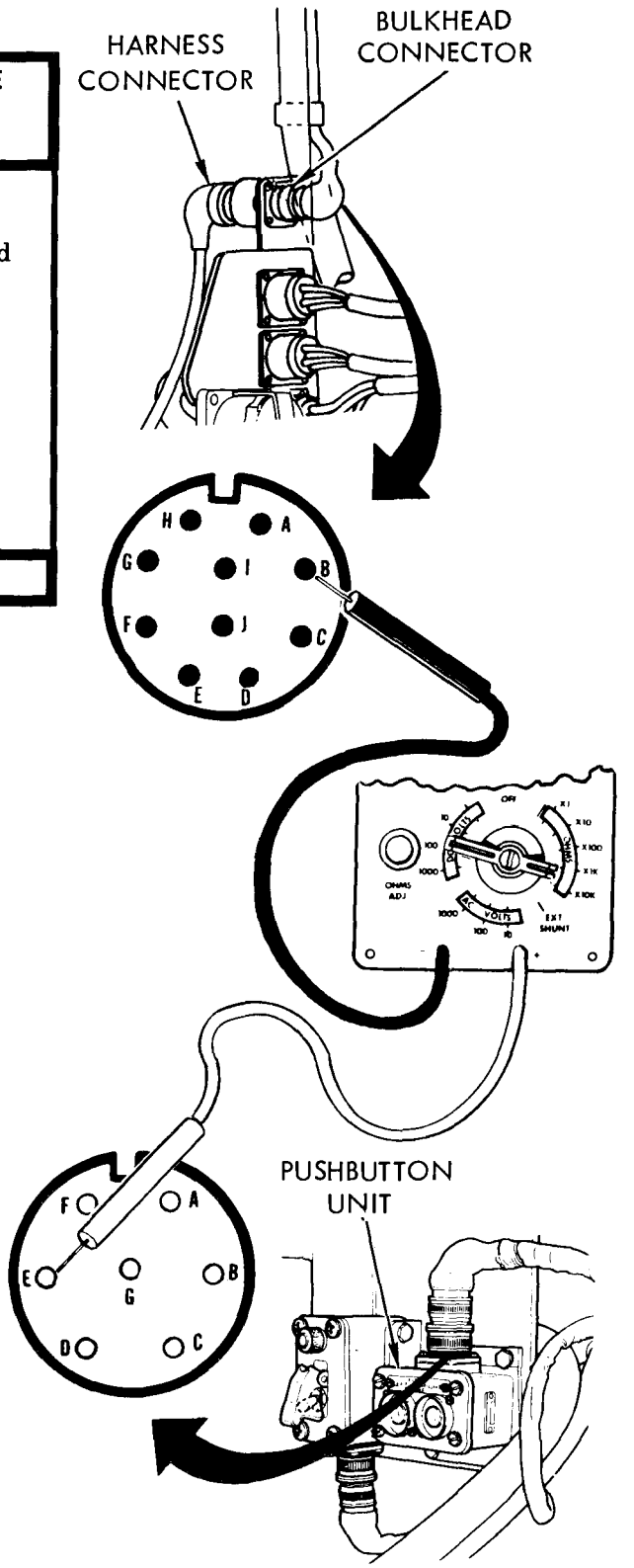
Does meter indicate continuity?

YES

77 • **Replace smoke grenade hull compartment wiring harness assembly (page 22-12).**

NO

78 **Replace smoke grenade crew compartment wiring harness (page 22-6).**



TA250684

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

Symptom 78

FROM STEP 42

79 **Check harness for continuity between socket C of connector at left discharger and socket D of connector at pushbutton unit.**

First Technician (Operator's Station)

- Set GRENADE POWER switch OFF.
- Set MASTER BATTERY switch OFF.
- Remove harness connector from pushbutton unit.
- Set multimeter to OHMS XI scale and zero meter.
- Connect black probe of meter to socket D of harness connector at pushbutton unit.

Second Technician (Left Discharger)

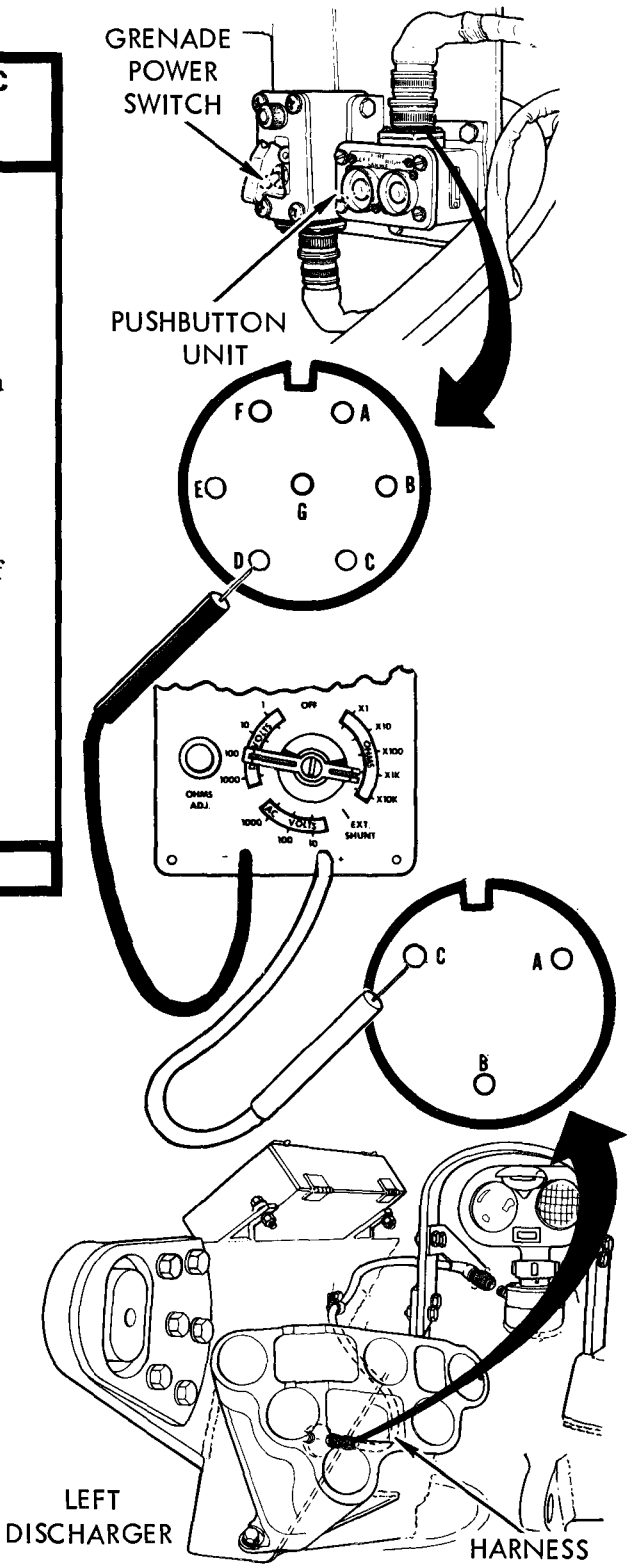
- Connect red probe of meter to socket C of harness connector at left discharger.
- Check if meter indicates continuity.

Does meter indicate continuity?

YES

80
- **Connect harness connector to jack on left discharger.**
- **Replace smoke grenade pushbutton unit (page 22-4).**

NO



TA250685

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

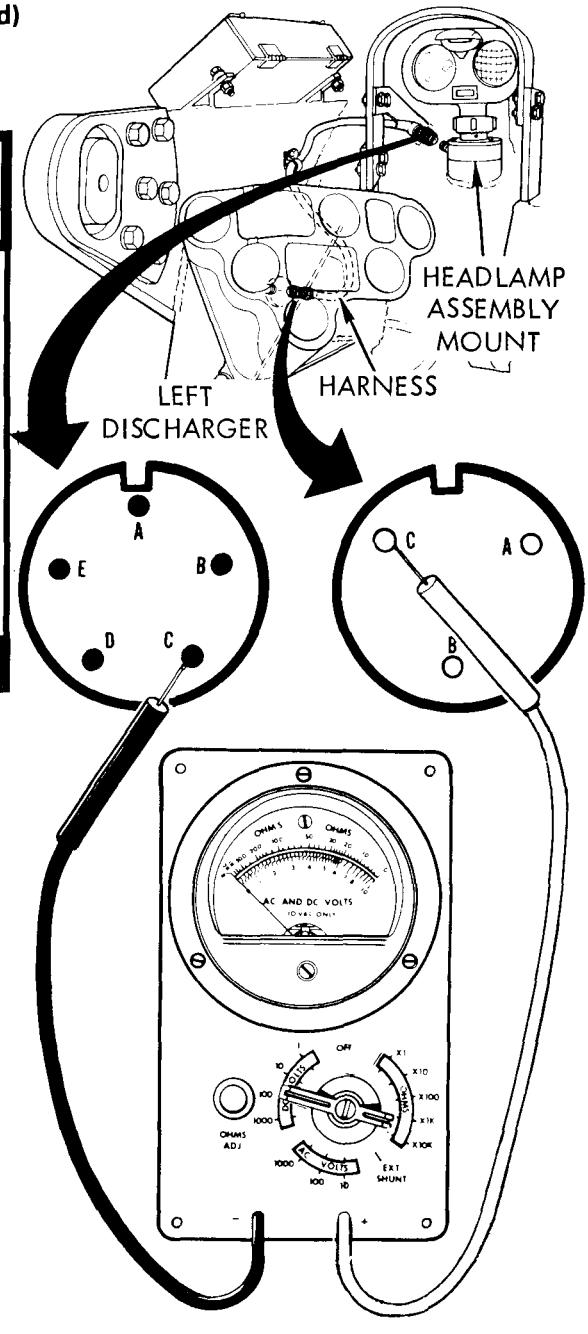
Symptom 78

81 **Check for continuity between socket C of harness connector at left discharger and pin C of harness connector at headlight assembly.**

Second Technician (Headlight Assembly)

- Disconnect harness connector from headlight assembly mount.
- Connect red probe of meter to socket C of harness connector at left discharger.
- Connect black probe of meter to pin C of harness connector at headlight assembly.
- Check if meter indicates continuity.

Does meter indicate continuity?



YES

NO

82
- **Connect harness connector to pushbutton unit.**
- **Replace wiring harness 12291327.**

TA250686

DETAILED TROUBLESHOOTING PROCEDURE
SUPPORT SYSTEM - SMOKE GRENADE LAUNCHER
(Continued)

Symptom 78

83 **Check harness for continuity between socket D at pushbutton unit and pin C of bulkhead connector.**

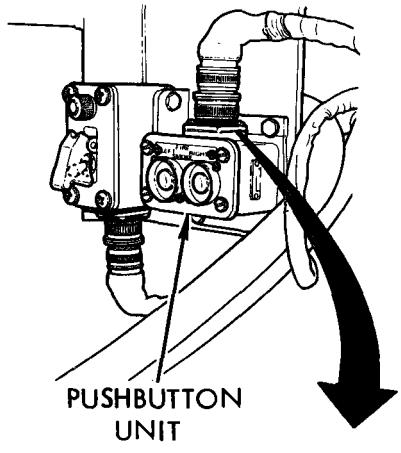
First Technician (Operator's Station)

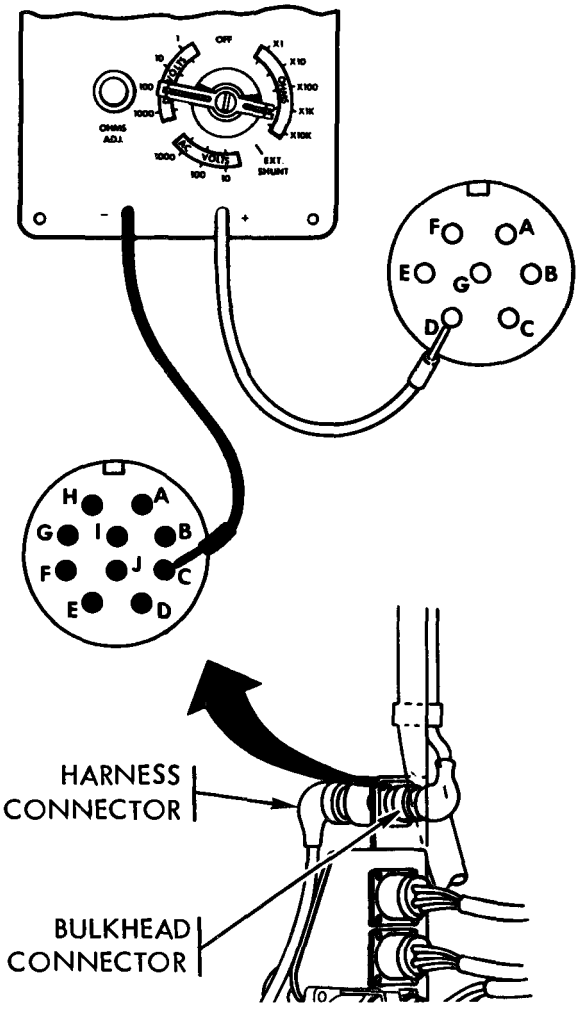
- Disconnect harness connector from bulkhead connector.
- Connect red probe of meter to socket D of harness connector at pushbutton unit.
- Connect black probe of meter to pin C of bulkhead connector.
- Check if meter indicates continuity.

Does meter indicate continuity?

84 ● **Replace smoke grenade hull compartment wiring harness assembly (page 22-12).** — YES

85 **Replace smoke grenade crew compartment wiring harness assembly (page 22-6).** — NO





TA250687

By Order of the Secretary of the Army

JOHN A. WICKHAM, JR.
General, United States Army
Chief of Staff

Official:

MILDRED E. HEDBERG
Brigadier General, United States Army
The Adjutant General

Distribution:

To be distributed in accordance with DA Form 12-37, Organizational Maintenance Requirements for Tank, Bridge Launcher, M60A1 (AVLB).

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PUBLICATION/FORM NUMBER	DATE	TITLE
TM 5-5420-202-20-1	25 October 1985	M60A1 Tank Chassis, Transporting for Bridge, Armored-Vehicle-Launched; Scissoring Type, Class 60

ITEM NO.	PAGE NO.	PARA-GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON (Provide exact wording of recommended changes, if possible).
	0004 00-2	4-7				Wrong POC is listed.

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PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

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THE METRIC SYSTEM AND EQUIVALENTS

LINEAR MEASURE

1 Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

WEIGHTS

1 Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 Lb.
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

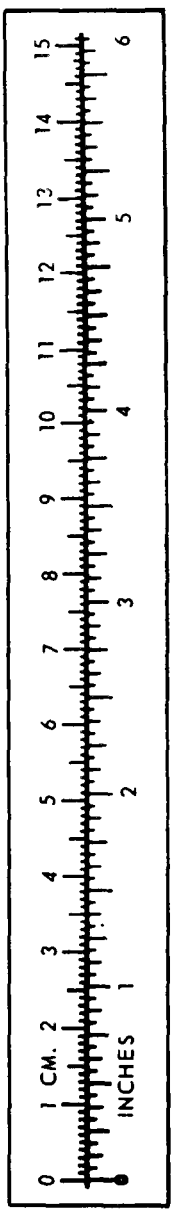
TEMPERATURE

$\frac{5}{9}(°F - 32) = °C$
212° Fahrenheit is equivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
$\frac{9}{5}\,°C + 32 = °F$

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
Pints	Liters	0.473
Quarts	Liters	0.946
Gallons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
Liters	Gallons	0.264
Grams	Ounces	0.035
Kilograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pound-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
Kilometers per Liter	Miles per Gallon	2.354
Kilometers per Hour	Miles per Hour	0.621



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